# SENATE RURAL AND REGIONAL AFFAIRS AND TRANSPORT REFERENCES COMMITTEE

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**Inquiry into industry structures and systems governing the imposition of and disbursement of marketing and research and development (R&D) levies in the agricultural sector**

## Wednesday, 4 February 2015
## Melbourne, Victoria

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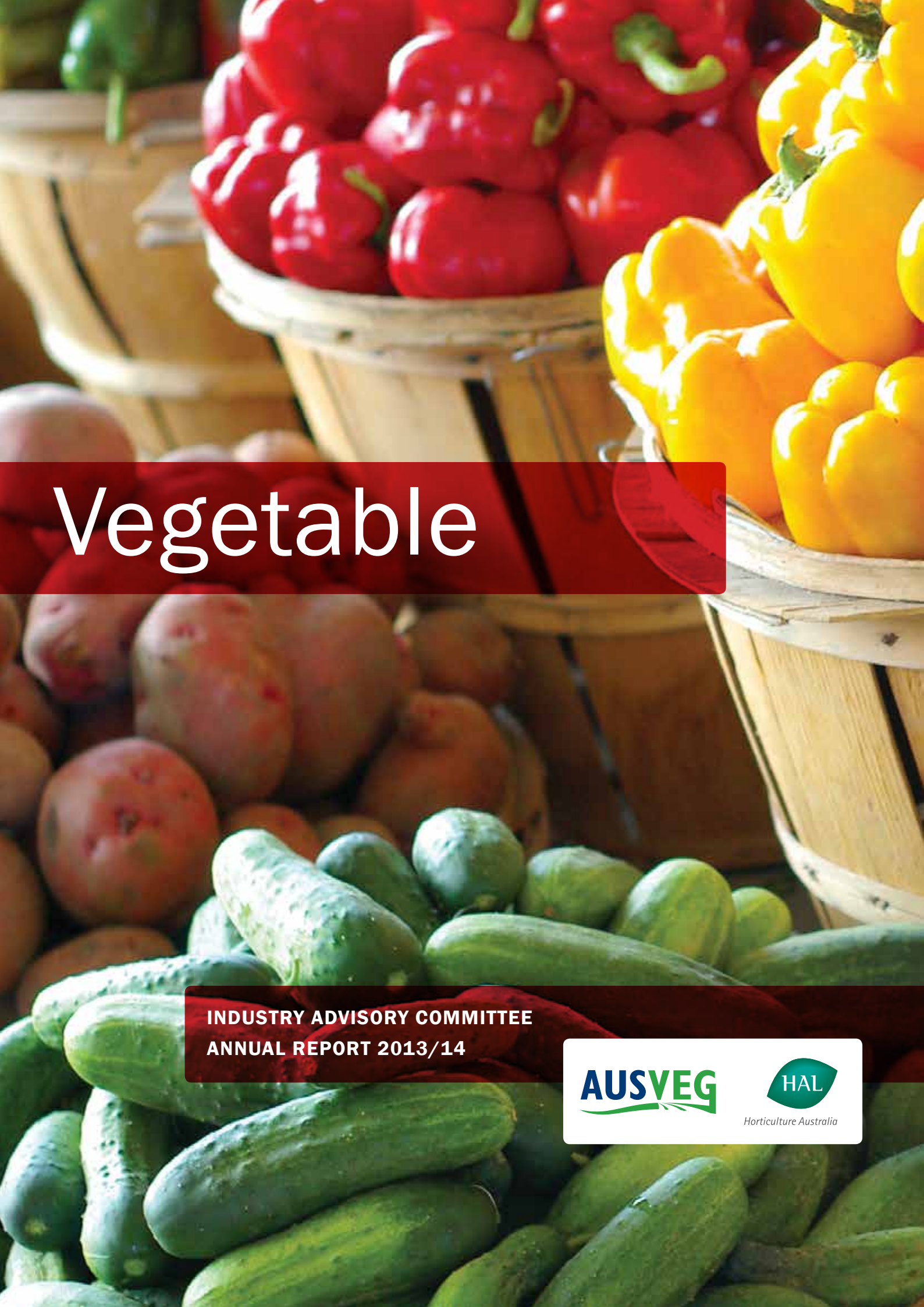

# Vegetable

**INDUSTRY ADVISORY COMMITTEE**
**ANNUAL REPORT 2013/14**

AUSVEG

HAL
Horticulture Australia

# Contents




**The projects in this report have been funded by HAL using the vegetable industry levy and/or voluntary contributions from industry with matched funding from the Australian Government for all R&D activity.**

# OVERVIEW

Real benefits are being realised by levy payers after two years of investment under the guidance of the vegetable industry's new Strategic Investment Plan. As you will see in this report, the portfolio of research and development (R&D) investments includes a mixture of projects with short-term outcomes and others with an expected long-term payoff.

In the short-term, projects such as the Growing Leaders and Negotiation Skills programs are equipping levy payers with enhanced business management techniques and the skills required to deal with an imbalance of power between suppliers and buyers. Projects such as these are available immediately to levy payers and feedback from participants shows that they can make a direct and positive business impact.

In the same vein, opportunities to visit overseas farming operations, supply chains and markets through study tours and trade exhibitions are delivering immediate benefits. In addition, these programs also deliver longer-term industry benefits such as the development of grower networks and a deeper understanding of export markets as an option for business development.

The industry R&D program is also delivering short-term outcomes through the collation, redevelopment and extension of existing information resources. On the productivity side, the industry R&D program is redeveloping old hardcopy pest and disease manuals into smart phone-based tools such as a pest and disease identification app and the InfoVeg web app, which has made a huge array of R&D outputs more accessible to growers and advisors. On the consumer side, the industry's Veggycation website, www.veggycation.com.au, has brought together a vast amount of health and nutrition information and packaged it into immediately useful forms such as Nutrient Information Panels and health claims that growers and others in the supply chain can apply to packaging and marketing materials.

Through Horticulture Australia Limited (HAL), the industry is also investing in longer-term projects that have the potential to deliver game-changing outcomes for the industry.

Removing the labour component of in-field and packing shed tasks is a critical outcome for the Australian vegetable industry and a number of investments are being made in this area, including the development of a vegetable industry-specific robot. If successfully implemented into vegetable farms, the robotic platform has the potential to dramatically change the way we farm and may also open up new market opportunities for Australian growers by increasing our global competitiveness.

Other long-term investments in export market access and development also have the potential to have a significant positive impact by improving or creating new market opportunities for Australia's high quality vegetable products. With a domestic market that has limited scope for growth, it is critical for the industry to commit itself to the development of new market opportunities in areas such as Asia and the Middle East.

## Levy investment

In 2013/14, the total levy income received was $15,708,124 of which the Australian Government provided $7,737,164 of matched funding to support 166 projects in the R&D levy program. Of these projects, 31 projects were funded by Voluntary Contributions (VC).

The current levy is 0.5 percent of the product value at first point of sale. A total of $13,783,712 was invested into R&D projects.

In addition to levy funds, $826,668 of VC was provided to the vegetable industry for supplementing levy-funded projects and/or solely funding VC-only. VC funds were matched by the Australian Government for all R&D activity.

HAL is responsible for managing these funds and takes advice on how to invest the funds from the vegetable Industry Advisory Committee (IAC). Consultation with the IAC is essential in determining the most critical investment priorities for the industry.

In 2013/14, AUSVEG acted as the service provider on 31 projects.

The industry also contributes 2.25 percent of levy and/or voluntary contributions (matched to 4.5 percent) to the across industry program and transformational investment program which addresses issues that affect all of horticulture, such as chemical access, plant biosecurity, market access and robotics.

## Strategic objectives

The process for determining the industry's priorities began with the development of the *Australian Vegetable Industry Strategic Investment Plan 2012–17 (SIP)*, which guides R&D investment over a five-year period.

The plan was developed to reflect the industry's priorities and the Australian Government's rural R&D priorities, and is reviewed regularly. The industry's objectives, as outlined in the strategic plan, are:

1. **Consumer alignment:** Better understanding and meeting of consumer needs both domestically and internationally to increase demand and/or price.

2. **Market and value chain development:** Developing new markets and capturing greater value for Australian vegetables. Expanding and defending existing markets.

3. **Productivity, resource use and management:** Improving farm productivity through the adoption of new technologies and techniques; making the most efficient use of resources.

4. **Development drive train.**

All projects in the R&D and marketing program address one of these objectives.

## This report

This report provides a snapshot of project activities in the 2013/14 year. The report's sections are divided by the industry's objectives to reflect the R&D activities being undertaken that address these industry issues.

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# Evaluating sweetpotato varieties to meet market needs

In 2009/10, Queensland and northern New South Wales produced 850,000 cartons of sweetpotato. Around 94 percent of this produce was the gold-skinned, gold-fleshed variety Beauregard. This heavy dependence on one variety of sweetpotato caused concern in the industry with its risk of serious impact from pests or diseases.

The goal of this project was to trial and introduce new varieties into the Australian market. Of the 50 cultivars examined, scientists and industry narrowed that list to five significant new cultivars.

This project has resulted in growers planting more varieties of sweetpotato, including the highly desired gold-coloured Evangeline, the red-skinned, white-fleshed Southern Star and the new purple varieties Eclipse and Philipino White.

The industry is still growing and adapting, with around five percent of sweetpotato cartons composed of the new cultivars. Continued research into issues with skin colour and inconsistent flesh colouration will raise growers' confidence with these new varieties, and therefore, that rate of uptake.

**Project VG09009**

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*New gold-fleshed varieties B63 and Evangeline, and Beauregard, the current industry standard.*

*Cudgen demonstration trial, May 2013.*

## Consumer attitudes and usage in the green leaf category

Commissioned to fill the gap in consumer research relating to the value-added green leaf category, this project was designed to provide the industry with important insights into consumer purchase behaviour when engaging with this category. The results from this research were drawn from quantitative and qualitative methods, including focus groups in three states and an analysis of Nielsen Homescan data over a six-year period.

The results show that the green leaf category is a staple in the diets of shoppers, with 65 percent of main grocery buyers purchasing pre-packaged salads at least once per month, and 81 percent buying a whole lettuce with the same frequency. The research revealed the most important factor in buying green leafs is quality and freshness.

The research also recommended future R&D in consumer attitudes to the green leaf category, as well as recommending the industry emphasise the freshness and quality of the green leaf category to boost consumer engagement.

**Project VG10094**

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# Transforming tenderness and eating quality in tropical sweet corn through introgression of tender germplasm

Combining tropical and temperate germplasm has the potential to transform tropical germplasm by introducing improved eating quality, quicker flowering time and better plant architecture. The tropical materials can also improve adaptation of temperate germplasm by introducing increased disease resistance.

To this end, a collaborative research project involving Hyland Snowy River Seeds (HSR), the Queensland Department of Agriculture, Fisheries and Forestry (DAFF) and Horticulture Australia Limited (HAL) was initiated in 2010. The aim was to introgress germplasm from the respective breeding programs to create sweet corn varieties with desirable features that are adapted to a wider range of growing environments, enabling growers to be more flexible with planting and harvesting time and be more competitive in the international market.

In 2013/14, a total of 41 F5 and 102 F4 family rows were evaluated for a range of agronomic traits, eating quality and uniformity. Nearly 30 percent of the F5 families were eliminated, primarily due to poor stand establishment and poor uniformity, and 29 lines were found to have acceptable agronomy. About 72 percent of the F4 families showed acceptable agronomy, particularly in terms of uniformity and quick flowering. The selected lines will be sent to HSR Seed for further evaluation, development and testing of new series of hybrids.

A total of 112 single-cross hybrids were created using both F4 and F5 lines. These hybrids were planted in an observation trial without replication, with detailed agronomic, flowering, disease reactions and quality data recordings made. Comparison was made with three commercial checks: Hybrix 5, Goldensweet improved and Garrison. Five hybrids showed promising combinations of all desirable attributes, including quick flowering, reduced plant stature and better productivity; they also showed better tenderness than Hybrix 5. Flavour shown was comparable to the three commercial checks.

Further testing will be needed to determine the adaption range of the hybrids and identify hybrids with consistent performance over seasons and across locations.

**Project VG10105**

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# Fostering and enhancing food safety in the vegetable industry

From 2006 to 2010, a total of 29 Australian food safety cases involved vegetables, with 510 people affected – 23 of which were admitted to hospital. Perceptions of poor safety of fresh food can have an impact on all businesses dealing with food production, distribution and preparation, and can have financial or legal repercussions and can significantly influence trade relations.

While major retailers and processors require food safety certification from their suppliers, food safety awareness and systems uptake amongst smaller-scale industry members is relatively low. This can put the entire industry at risk. Data shows that vegetables eaten raw are the most frequent cause of individual food-borne illness outbreaks traced back to vegetables.

The report recommends that the industry determine which critical limits used in food safety schemes need to be reconsidered for Australian conditions, as well as aligning the multiple third-party certification schemes to reduce the number of different certificates needed by individual businesses. It also recommends public education about food safety while fostering industry awareness of risks and legal requirements, especially for small scale operators.

**Project VG13020**

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# Conveying the health benefits of Australian vegetables

Veggycation® is an education tool that aims to simplify the complexity of food standards and enable greater use of relevant nutrition and health labelling for fresh vegetables. This project's aim was to communicate nutrition and health benefit messages about levied vegetables to diverse vegetable industry stakeholders via presentations, articles and a web presence with downloadable content and links.

The overarching goal of the project was to educate Australian consumers on why vegetables are healthy, with a view to increasing the consumption of Australian-grown vegetables. The primary step was to engage key stakeholder groups to develop a shared nutrition and health language.

This engagement with stakeholders (including growers, industry associations, grower associations, wholesalers/markets, retailers, educators, public and community health groups, food writers and chefs) was integral to the project's success. The information on the Veggycation® website is based on pre-approved nutrition and health claims from Food Standards Australia & New Zealand (FSANZ) Standard 1.2.7 and nutritional data from the Australian Nutrient Tables (NUTTAB). The Veggycation® team translated pre-approved FSANZ nutrition and health claims into more consumer-friendly 'health benefits'. This way, the information is more easily understood by all, from the growers to the consumers.

A database can be accessed from the web portal (searchable by vegetable, by nutrient and by health benefit), guidelines for using the information are provided in a range of different formats (including case studies for root, fruit and leafy vegetables, a how-to guide, standardised Nutrient Information Panels [NIPs], images of whole vegetables and serving size amounts, and posters suitable for application in health and education) and nine health benefit icons are freely available to the fresh vegetable sector for marketing their vegetable foods.

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

In 2013, Review Partners was commissioned to research and assemble key facts and figures relevant to the Australian vegetable industry into a structure that could be accessed effectively through a web-based interface. The interface, once completed, will be accessible via smart phone and available to consumers, policy makers and industry participants to provide a simple and engaging means of communicating the benefits of the vegetable industry to Australians.

The ultimate outcomes of the project will be:

- Increased consumer knowledge of the importance of vegetables in their lives and diets
- Increased support for the Australian vegetable industry among the general population
- Increased understanding of the Australian vegetable industry's contribution to society among local, state and federal agencies.

The first stage of the project, which involved an extensive literature review and evaluation of available information, has been completed. The project was put on hold in January 2014 while other economic analysis work was being undertaken.

**Project VG12090**

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# Environmental assessment of the vegetable industry

This project focuses on undertaking an environmental assessment of the vegetable industry. The environment assessment will inform the vegetable industry of its environmental performance, provide a baseline for ongoing assessments, inform future strategic industry investments and provide stakeholders and the public with documentation on the performance of the vegetable industry's environmental management.

Implementation and demonstration of improved environmental management by industry is necessary:

- To meet the public good expectations for natural resource management ('environmental stewardship')
- To meet consumer expectations for minimum environmental performance ('environmental assurance')
- For continued access to and efficient use of resources ('resource use efficiency').

The planning stage of this project was completed in August 2014, which included a desktop review and consultation with industry, environmental assurance programs and market chain participants. The final environmental performance report will be delivered in November 2014.

**Project VG13057**

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# Consumer and market program for the vegetable industry

There is an increasing need in Australia's horticulture industry to monitor and gauge consumer perceptions and behaviours towards fresh vegetables. To this end, Colmar Brunton Research (CBR) is conducting a three-year tracking study investigating consumer perceptions and behaviours towards fresh vegetables. The project aims to understand consumer needs and their buying behaviour regarding fresh vegetables, and to identify product trends seen in overseas markets. The first year of tracking has been completed, including 12 waves of online monthly tracking and monthly updates of the Interactive Research Tool (IRT). Qualitative and quantitative ad-hoc projects were also completed in late 2013.

Some of the key findings since the commencement of the project include:

- Top five vegetables for consumer satisfaction: pumpkin, broccoli, capsicum, lettuce and cabbage
- Top five vegetables for interest in new varieties: Asian vegetables, green peas, capsicum, baby spinach and lettuce
- Awareness of varieties is low, but the desire for more information and varieties is high
- Key provenance claim for consumers is to know their vegetables are grown in Australia
- Freshness is a key driver of future purchase while limited shelf life is a barrier.

The project is moving into its second year, which has seen the inclusion of four new commodities for tracking: chillies, eggplant, beetroot and sweetpotato. The qualitative and quantitative ad-hoc projects will focus on segmenting the fresh vegetable consumer market to find opportunities and insights to increase vegetable variety and consumption.

Overall, the project aims to arm growers with actionable information about what consumers want from their vegetables, their barriers to purchase and how can these can be overcome. It is hoped that growers can use the monthly recommendations to tailor their business — including crops, packaging, and product information — to encourage future purchase.

**Project VG12078**

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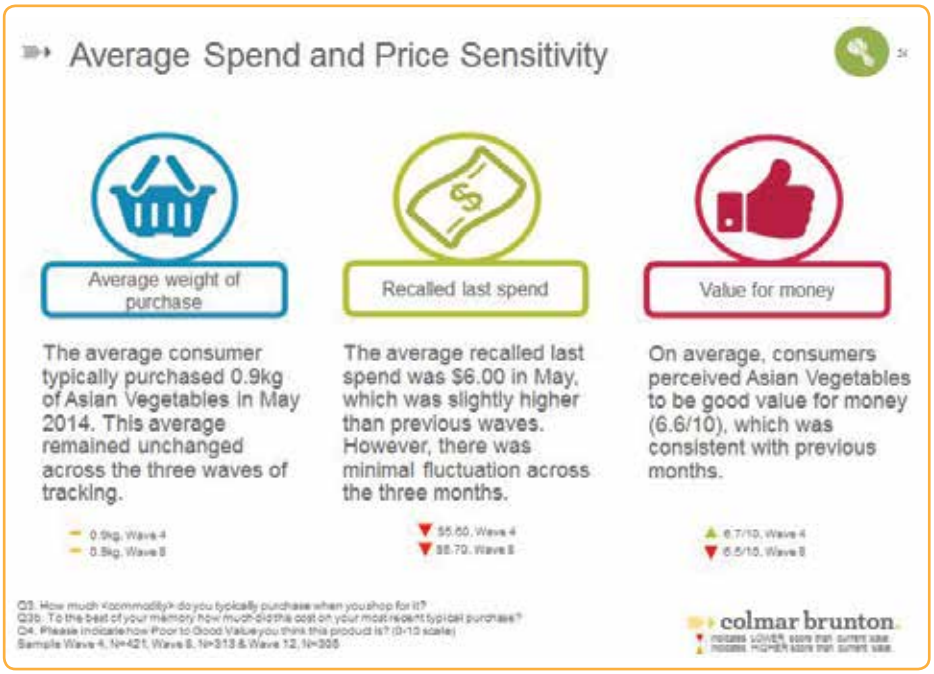

# Implementing a vegetable industry crisis management plan

From May 2013 to April 2014, Control Risks consulted with Horticulture Australia Limited to develop the crisis management capability of AUSVEG.

The first phase was risk assessment, including extensive dialogue with a broad range of industry stakeholders, a workshop with AUSVEG staff and a confirmatory briefing to the Vegetable Industry Advisory Committee (IAC). This risk assessment identified 29 potential sources of crisis of significant importance facing the industry, prioritising them and proposing potential treatment measures.

A crisis management plan was then designed as an operational document with a simple process to manage a full range of crisis issues. The plan also included specific tools to assist AUSVEG in the event of product contamination or extortion, and was stress-tested through two training events, which resulted in minor amendments being made to the document prior to finalisation.

The AUSVEG crisis management team (CMT) was introduced to the plan through a tabletop exercise and then tested in a more complex and challenging simulated incident. Both training events highlighted areas of improvement for the CMT, particularly in their approach to delegating tasks and decision-making. Nonetheless, the team progressed well through the two training activities.

Once the Grower Handbook (a concise leaflet guiding the actions of growers in a crisis) had been approved, it was distributed via *Vegetables Australia* magazine, and Control Risks subsequently presented at five levy payer meetings to outline the crisis management concept to growers.

This project has provided AUSVEG and vegetable growers with a sustainable, integrated and robust crisis management capability that is forward-looking in terms of its ability to detect emerging crisis issues.

**Project VG12091**

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# New vegetable products for personal nutrition

Plant foods are good for consumer health, with a role in preventing all chronic diseases. Metabolites present in plants have the capacity to manage oxidative stress and consequent inflammation. Furthermore, people who have a genetic pre-disposition towards elevated inflammation can be easily identified using inexpensive testing methods, and could especially benefit from increasing plant food intake.

However, apart from general principles of variety, little knowledge exists regarding optimising combinations and proportions of plant foods for optimal health effects. This project aims to use food processing tools to prepare metabolite-enriched products from plants that offer new opportunities for developing personalised, value-added consumer products.

The first year of this project successfully developed a model for predicting absorption rates of plant metabolites. This model will allow plant extracts to be optimised for anti-inflammatory function according to the cycle of inflammation associated with healthy processes and unhealthy chronic diseases. CSIRO is currently preparing a selection of products for further in vitro and in vivo studies.

**Project VG12096**

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# Market analysis and strategy: broccoli to Japan

A report has identified potential opportunities to re-establish Australia's broccoli exports to Japan and recapture 10 percent of the import market. The project team will produce an in-depth analysis of the broccoli market in Japan and develop a three year export investment strategy to develop broccoli exports to Japan.

There are six key components to the project: desktop research, supply chain mapping, consumer research, competitor analysis, economic analysis, communication and extension.

The desktop research revealed that in 2013 Japan imported 36,000 tonnes of fresh broccoli valued at ¥7.2billion (AUD$76 million). Over the last five years, the value of fresh broccoli imports has grown by 50 percent and the volume by 22 percent. The USA presently dominates Japan's imports of fresh broccoli, holding 88 percent market share. Other players include China (11 percent) and Mexico (one percent). Japanese Trade Statistics indicate the USA is commanding a price premium of between AUD$0.26 per kilogram and AUD$0.61 per kilogram over its competitors.

It is envisioned that the forthcoming Japan-Australia Economic Partnership Agreement would eliminate the present tariff of 3 percent on broccoli exports from Australia providing a slight advantage over the USA.

An industry consultation seminar for this project held in June involved key stakeholders and businesses from along the supply chain from Queensland, Western Australia and Victoria. A project steering committee was formed following the seminar and is made up industry representatives from along the supply chain.

The project committee had their first meeting and are oversighting the activities of the project. The in-market supply chain mapping, competitor analysis and consumer research will be undertaken in September. The project team following industry consultation are seeking to identify opportunities for the Australian industry to differentiate itself from other competitor supplies to the Japanese broccoli market.

Communication and extension activities will continue, with the circulation of key findings from the seminar, release of video presentations and dissemination of profiles from each major section of the project.

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## 2014 Produce Innovation Seminar

The 2014 Produce Innovation Seminar, held on 19 June in Cairns, was designed to showcase methods of producing value-added vegetable products that demand a higher price point and increased profitability. The seminar largely showcased innovations from the USA, a national industry recognised as world leaders in value-added production.

The goal of the seminar was to expose the industry to new ways of thinking about production and promotion of vegetables. It is hoped this information will encourage suppliers to move into increased value-added production and move away from competing solely on volume, quantity and price point of fresh produce, which in turn should lead to greater profitability and higher returns.

Topics at the seminar included US product innovations, ways to value-add to product by enhancing nutritional value, and potential new directions for product and packaging development.

A final report outlining details of the seminar, a full list of expected outcomes, and delegate feedback and recommendations has been made available to all levy payers and the wider industry.

**Project VG13033**

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# Optimum vegetable portion size to meet consumer needs

The vegetable industry is looking for ways to increase vegetable consumption. It was hypothesised that consumers might be buying fewer vegetables for fear of creating waste. Accordingly, research was sought to explore the potential for optimising portion sizes to drive increased consumption.

This project focused on six vegetables: carrots, pumpkin, cabbage, cauliflower, celery and broccoli. A six-stage study was undertaken with the aim of determining the most desired portion sizes for consumers.

It was found that consumers have strong aversions to vegetable wastage. Emotionally, wastage evokes feelings of guilt; rationally, consumers do not like paying for food they don't use. Accordingly, consumers would rather pay more per kilo if it meant less waste.

81 percent of consumers already try to purchase the right amount of vegetables for their needs. While there is not necessarily one optimum portion size for each vegetable, offering a larger range of sizes was linked to a rise in purchases – which, according to the survey, would be in addition to what is already purchased.

New portion sizes do not necessarily need to be developed, with consumers reacting positively to a greater availability of the 'standard' vegetable options – and therefore less inconsistency of availability across locations.

The findings were presented to a range of retailers, with diverse reactions driven by grower relationships and business models. These findings included that:

- Consumer aversion to waste presents substantial opportunity for industry
- Preference for vegetables in their natural state presents an opportunity for 'smaller' sizing
- Offering a greater range of portion options will increase overall vegetable purchase
- Consumers would welcome greater inspiration on how to use vegetables
- The idea of a 'vegetable butcher' appeals for its nostalgia and increased value
- Inconsistencies in 'fridge life' suggest opportunities to improve the supply chain
- Industry was seen as the natural champion for reducing vegetable waste.

These findings clearly provide potential for increased purchase and consumption of the vegetables in focus.

**Project VG12094**

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# Evaluation of quality assurance software for the vegetable industry

This project will investigate the myriad of tools available for use by vegetable producers related to the traceability of products through the supply chain and compliance with quality-assurance systems. These tools include software packages for PC, apps for mobile devices, and quality off-the-shelf print manuals. It will compare costs, specifications and features for these tools.

Its aim is to provide producers with the ability to review and assess tools for their individual use and to provide information that can help developers make apps and software that will meet the needs of vegetable producers.

The project's desired outcome is raising awareness of the tools available to the vegetable industry, and to enable growers to have the ability and confidence to make informed decisions on the suitability of each tool for their business.

The first phase of this project commenced in July 2014.

**Project VG13082**

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# Identifying market opportunities for Australian vegetables in China

The study was focused on exploring the opportunities for Australian vegetables in China. Over the course of three stages of qualitative and quantitative research, conducted over 2013/2014, research was conducted amongst Chinese consumers, as well as local retailers, wholesalers, government officials and opinion formers.

The three tier-one cities (Shanghai, Guangzhou and Beijing) have a cumulative population of 56 million people, of whom roughly one-third have an income similar to average Australians. This large audience is open to considering Australian produce. The target market was defined as households with a household income of over 15,000 RMB (AU$2,500) per month – approximately 11.6 million people consuming 3.3 million tonnes of vegetables in 2013.

Consumer demand is driven lack of confidence in the safety and quality of Chinese produce, particularly compared to Australian vegetables, and the following positioning concept was developed and found to be compelling to target consumers: "The freshest, safest, most nutritious and tasty vegetables, grown in the unpolluted soil and water of Australia. Complying with Australian government standards, they're perfect for your growing family."

Modern channels, such as hypermarkets and premium retail, are addressable by Australian producers, and are steadily replacing traditional wet markets and should be the primary target channels.

Target consumers are already paying premium prices for product. The sweet spot for Australian produce is likely to be between domestic (Chinese) farm branded produce and domestic organic, the two highest price strata (up to five price points can be commonly found in hypermarkets and in the market generally).

While there is an opportunity to sell individual species, the development and delivery of an Australian 'range' is likely to be easiest to sell through premium retailers and would benefit from economies of scale in delivery; high-level value chain analysis shows an opportunity to profitably meet target consumers' demand.

This project was completed earlier in 2014 and the results were presented at this year's AUSVEG conference in Cairns, with a full report available online. Further work, in a separate study, is now underway to more fully explore market entry issues.

**Project VG12095**

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# Review optimal cooking techniques for vegetables to maximise retention of nutrients

This project aims to provide information on the effect of cooking on the flavour and health benefits of all levied vegetables. This information is being used to demonstrate optimal cooking techniques for maximising nutritional content, using Asian vegetables as examples. Resources are being developed to communicate this information to stakeholders such as dietitians and caterers.

Researchers have used internationally recognised cooking retention factors for key vitamins in specific vegetable types, cross referenced with the Veggycation® database. The project incorporates additional information to the www.veggycation.com.au website, including the comparative nutritional content of frozen and canned vegetables. Different types of Asian vegetables have been cooked using techniques recommended by Asian cookery experts, and the Vitamin C content analysed by an accredited laboratory.

This project is currently underway and results already obtained have been promising.

This report will help the industry raise awareness of valuable resources to communicate the health benefits and recommended cooking methods for vegetables, giving consumers the optimum benefits from cooked vegetables.

**Project VG13087**

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*Cooking with Asian vegetables.*

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

EnviroVeg is a well-established and recognised program in the Australian vegetable industry, providing environmental 'best practice' resources to growers and communicating the industry's strong track record of sustainable environmental management.

Now in the second year of its current three-year project cycle, EnviroVeg aims to continually increase grower participation numbers, hectares covered by the program and the net environmental benefit which can be achieved by the vegetable industry. An independent mid-term review, which assessed the program's success over the first half of the project, has been provided to Horticulture Australia Limited.

The EnviroVeg Platinum program has continued to grow and is now recognised by the vast majority of growers as their preferred environmental accreditation program. The first audits of growers under the EnviroVeg Platinum program have also been booked. As these growers become accredited, AUSVEG plans to use them as case studies and champions to promote the program to other growers.

EnviroVeg's smartphone application was released in late 2013, with the Federal Minister for the Environment officially launching the app. The app has been made available to growers free-of-charge and assists in record keeping, as well as monitoring water and energy use.

AUSVEG has consistently promoted the EnviroVeg Program to growers and industry stakeholders, distributing regular communications on the performance of the program. Through regular press releases, AUSVEG has achieved widespread media coverage of the program, with EnviroVeg Platinum and the EnviroVeg smartphone application receiving significant attention. This has increased knowledge of the program with both growers and people outside the industry.

Other key deliverables in the past year include the implementation of the EnviroVeg Grower Survey, which was used to gain feedback from growers and measure the success of the program, and continued information sessions and industry events. AUSVEG continues to promote the program and highlight R&D through regular email updates, quarterly newsletters and articles in Vegetables Australia.

**Project VG12008**

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# Malaysia and UAE market analysis

## Bay leaf and long beans

The diversity of the Australian vegetable industry has generated strong development potential overseas, particularly in South-East Asia, due to its close proximity to Australia, and the United Arab Emirates (UAE) with its expatriate population and strong consumption culture of Western-cultivated greens. Long beans and baby leaves are considered strong categories for these export markets due to their current limited presence in the area.

A feasibility study for exporting these product categories to Malaysia and the UAE was carried out over 15 weeks between 18 November 2013 and 28 February 2014. Throughout the course of the research, a comprehensive inquiry was conducted on local consumers' preferences through surveys and in-store interviews, and trade interviews with local industry stakeholders were used to discover the optimal route-to-market distribution strategy and import criteria of local importers and distributors.

The project also compiled a database of supply chain participants in Malaysia and the UAE, which is expected to help exporters gain knowledge of export market specifications and help forge stronger trade relationships.

A key finding from the study was the general lack of feasibility for long bean imports to both Malaysia and the UAE. However, baby leaf products were found to be a feasible option for the UAE, due to increasing consumption by individual consumers and the food service industry; similar factors also support developing the Malaysian market for baby leaf vegetables.

Recommendations from the project for both markets include campaigns to promote Australian vegetables, the importation of organic produce to capture a higher price point, and strong branding for pre-packed baby leaves to emphasise the points of difference for Australian produce.

**Project VG13046**

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## Carrots and sweet corn

Carrots dominate leviable vegetable exports, contributing 75 percent ($52.4 million) of total export value for 2012. Previous studies have indicated that sweet corn exports could have additional potential. This project aimed to prepare an R&D investment plan along these lines, as well as complete an analysis of the fresh carrot and sweet corn markets in the United Arab Emirates (UAE) and Malaysia to identify and profile relevant supply chain participants that would assist growers to develop export trade networks.

The project focused on growers, with 17 carrot grower/packer/exporters and nine sweet corn grower/packers contacted prior to project commencement for their views on study parameters. In addition, growers were nominated by industry and funded to participate in the in-country market research components of the project. This approach meant growers were able to converse directly with supply chain partners and provide an initial assessment of whether there were commercial opportunities.

Opportunities to grow the export market for carrots and sweet corn were identified in the UAE, and additional commercial opportunities were also identified for carrots in Malaysia. The *Three-Year Market Development Investment Plan for Carrots* in the UAE and Malaysia was developed after desk-based analysis, field investigations, and long listing of investment options and return on investment (ROI) analysis.

The recommended Carrot Plan includes 13 strategies spread across three plan objectives with the goal of doubling exports within five years (to 35,000 tonnes in the UAE and 20,000 tonnes in Malaysia). ROI analysis was positive, with a $5.40 return for every dollar invested in the plan.

Market analysis revealed that Australian investment in the Malaysian sweet corn market was not warranted, with Malaysia virtually self-sufficient in sweet corn. The sweet corn investment plan for the UAE includes four strategies spread across three plan objectives with a goal of achieving 200 tonnes of exports within three years. Once again, return on investment analysis was positive, with $4.40 for every dollar invested.

**Project VG13047**

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*South African sweetcorn and Australian carrots for sale in the UAE.*

# Baseline demographic research for the vegetable industry

Nielsen's HomeScan Consumer Panel is a panel comprised of 10,000 households demographically and geographically matched to represent the Australian population. Panellists scan every grocery and food item purchased with a hand-held scanner, with individual codes used for key fresh items (such as fresh fruits, vegetables, dried fruits and nuts). Nielsen then processes this wealth of information to produce the data as either reports, business issues analysis/ consultation, or presentations.

This project provides participating industries with expert analysis and insights generated from the interrogation of HomeScan data for better understanding of their product in the complex and highly competitive food market. These analyses and insights will help industries better understand their current and future customer base, channel to market, regional and packaging opportunities that will help industries grow their sales and increase consumer consumption.

In order to provide fresh vegetable industries with the best possible consumer insights to grow consumption, this project is based on proven sources of consumer behaviour and purchase information.

This project will provide the various sectors of the vegetable industry with knowledge to increase their understanding of customers, and will teach the industry to devise strategies to increase consumer demand. Through employing a unified approach to the processing, analysing and reporting of consumer purchase data, Industries can use this data to add greater value through the provision of shopper insights and assisting the customised market development and consumption growth strategies that maximise an industry's returns.

This project will continue to enhance existing industry knowledge and understanding of their products by providing independent, third party analysis of products and categories.

**Project VG13088**

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# Developing a vegetable education kit

CSIRO Food and Nutrition and CSIRO Education aim to develop a Vegetable Education Kit for children in Australian classrooms, then scientifically determine its effectiveness and develop a strategy for potential widespread adoption.

This 18-month project has commenced its initial phase with a feasibility study to identify crossover with the National Curriculum objectives, as well as undertaking a review of similar overseas classroom-based education programs to determine best-practice approaches.

It is expected that teaching children with the Vegetable Education Kit in the classroom will lead to an increased awareness, acceptance and willingness for children to consume vegetables. This is expected to positively influence vegetable consumption, thereby increasing demand. As children's food preferences have been shown to follow into adulthood, this program may contribute to setting life-long eating habits, potentially increasing future demand for vegetables even further.

**Project VG13089**

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# New end-point treatment solutions to control fruit fly

Many quarantine treatments currently practiced are either banned or under serious threat, increasing the need for safe, reliable alternatives for Australian fruit and vegetable growers. This project will test the efficacy of hypobaric pressure - a new technology being developed overseas.

A set of research level hypobaric pressure chambers is currently being built in the USA for delivery by the end of August 2014. A literature review is also being carried out detailing technology's history and the recent rapid rise in research based on significant improvements in the technology.

Several meetings have been held with export and shipping industries and there is interest in this project.

This new quarantine technology has potential as a low- or nil-chemical treatment that will eradicate many quarantine insect pests while maintaining or even improving product quality. It is also likely to be of use to other export industries such as dairy, meat and cut flowers.

**Project VG13043**

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Since 1994, Australian capsicums have been exported to New Zealand using a protocol based on in-line flood spraying with dimethoate. This market was effectively closed to Australian capsicums growers in fruit fly-endemic areas following the suspension of dimethoate as a post harvest disinfestation treatment for capsicums in 2011.

This project aims to conduct further disinfestation trials against fruit flies to develop trading protocols for capsicums to New Zealand using low-dose methyl bromide fumigation.

This project will conduct trials against four species of fruit fly with the effective doses identified in project VG10126 necessary to meet quarantine requirements for New Zealand. The benefits to industry will be the development of an export protocol using low-dose methyl bromide. This research will also be valid for other export markets.

Due to the recent approval of the project, no results are available at this point.

**Project VG13044**

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# Improving efficacy of MAT to enhance area-wide management of Queensland fruit fly

With growing restrictions on the use of chemical insecticides, there is a need to increase the effectiveness of alternative approaches for fruit fly control. One such technique, Male Annihilation Technique (MAT), uses chemical lures that attract male flies to a toxic bait station. Here they are killed, thereby constraining reproduction of wild populations. Without mating, female fruit flies cannot produce fertile eggs; in turn, this under-production reduces crop infestation.

This project aims to increase the effectiveness of fruit fly MAT through developing new and more powerful lures. Macquarie University has assessed the stability and volatility of commercially available fruit fly lures, as well as some potential newly-developed lures. Some are highly attractive, but also unstable – over the coming year the project will work toward developing deployable formulations, with the dual goals of maximising fruit fly attraction while also ensuring acceptable stability under field conditions.

**Project MT12004**

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*Male fruit flys caught in a trap baited with a powerful new fruit fly lure.*

# Market Access Manager

The Office of Horticultural Market Access (OHMA) is an industry-based committee established to provide industry advice to government agencies for negotiating quarantine and non-quarantine market access. The OHMA aims to maximise the opportunities for Australian horticultural market access through involvement under three key pillars: raising the profile of Australian horticulture; providing support in access negotiations; and supporting science inputs into market access.

The OHMA Market Access Manager has worked to develop relationships with key exporting industries and government departments involved in the market access process. The Market Access Manager's role is to work with industry on market access, to develop and maintain relationships with government bodies towards this end, and to communicate issues and outcomes back to industry.

While there have been some important achievements in the past year, the process of gaining market access remains a slow and difficult one. The usual lengthy process of securing phytosanitary protocols in north Asian markets was supplemented by a trend toward more restrictive protocols in South-East Asia, as well as import restrictions in Indonesia. The Australian government has had a busy program of Free Trade Agreement negotiations over a number of years, but actually finalising agreements has proved elusive, with the notable exception of the recent agreement with South Korea.

OHMA has held a number of discussions over the last year about how to improve the way it operates, including the possibility of increasing staff numbers. Industry continued to see an important role for OHMA in prioritisation and coordination of industry market access issues, but industry resources were not available to expand OHMA staffing at this point. This will be considered again in 2015.

**Projects MT12028 & MT12029**

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

Zeaxanthin, a plant pigment accumulated in the human eye to protect against macular degeneration, cannot be synthesised by humans and must be obtained from dietary sources. The aim of this project has been to develop a variety of sweet corn, naturally a high source of zeaxanthin, with an elevated concentration of the pigment – the amount required to supply a supplementary dose would require ingestion of more than four average cobs per day, which is highly unlikely.

The project has therefore developed several high-zeaxanthin parent lines with zeaxanthin concentration high enough such that a supplemental dose (2 mg/person/day) can be obtained by consuming a small cob as part of a normal meal. In 2013/14, over 80 experimental hybrids were produced and evaluated, with eight lines selected on the basis of zeaxanthin concentration, cob quality and agronomy. Four of these lines were subsequently evaluated for consumer acceptance.

**Project VG07081**

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# Low dose methyl bromide treatment of capsicum to control fruit fly

Until recently, Australian capsicums were exported to New Zealand using a protocol based on in-line flood spraying with dimethoate. When dimethoate was suspended for postharvest use on capsicums, this effectively closed the market to Australian capsicums grown in fruit fly-endemic areas.

This research project investigated the use of low-dose methyl bromide (MB) as an alternative treatment to dimethoate. The efficacy of a range of MB concentrations, treatment temperatures and treatment durations were tested, with results showing low-dose fumigation could be very efficacious provided that the treatment time was extended sufficiently. Research showed 16g/$m^3$ MB at 16°C for four hours was effective against Queensland fruit fly, compared with current protocols, which require 40g/$m^3$ MB for two hours.

The project was completed in February 2014, and the most suitable dose identified in this project is being used in the follow-on project (VG13044) to develop a new market access protocol for capsicums to New Zealand.

**Project VG10126**

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# Vegetable R&D program implementation and design team support

*The Australian Vegetable Industry Strategic Investment Plan 2012–17* strongly suggested that the industry should embrace a new approach to project commissioning, as the National Vegetable Levy has not always been invested in a manner which achieves optimal outcomes. Consequently, the industry program is now developed with greater upfront input from the industry and the resulting project ideas are commissioned via a competitive tender process.

The new approach has had a positive effect on program development and outcomes by ensuring that projects better meet the needs of industry and are better value for money. At the same time, the new approach has required a greater level of input at the front end of the conceptualisation and development process. Horticulture Australia Limited (HAL), the vegetable Industry Advisory Committee (IAC), the project Design Teams and AUSVEG have all been required to invest greater time and effort in developing project concepts before and after they are put to tender.

The current phase of the project has funded a Vegetable R&D Program Implementation and Design Team Support Officer within HAL whose role has been to assist in coordinating consultation activities and tendering activities, writing tender briefs and ensuring timely contracting and ongoing management of the program.

The officer worked closely with the HAL Industry Services Manager and the AUSVEG Design Team Coordinator to ensure the recommendations of the Design Teams were effectively and efficiently developed into specific R&D projects and then forwarded to the IAC for endorsement and commissioning.

As well as the positive effect on program development, this project has also supported better communication and follow-through for recommendations made by Design Teams, as well as increased adoption and implementation of project ideas and concepts at the Design Team level.

**Project VG12038 and VG13019**

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# Understanding the nature, origins, volume and values of vegetable imports

Given the high number of imports in the Australian vegetable industry, understanding the factors contributing to these large numbers and how the local industry can compete in response is a high priority.

This project examines import data for a range of vegetable crops and seeks to validate and explain this data through industry consultation. The project has shown major import volumes are occurring in the frozen sector, followed by the preserved (tinned) sector, with relatively few imports in the fresh vegetables sector. The volume of imported vegetables in the 2013 calendar year is relatively similar to 2012, showing a steady state or mature market in operation.

The project provides annual updates of import prices and volumes of product, as well as recommendations for levy-paying growers for how they can compete against imports. Annual updates will be released each year in July.

**Project VG12083**

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## Sharing postharvest best practice

Much of the focus in vegetable levy investment has been on increasing productivity and finding production efficiencies. More recently, the industry has sought to increase consumption. Postharvest handling, the link between these activities, has historically received less attention.

This project aims to document strategies that achieve post-harvest efficiency for vegetable farmers, with the dual goals of improving quality and shelf life and reducing cost.

While this project is still in the early stages, the first task involves reviewing and evaluating best practice recommendations. Many may be out of date, referring to old cultivars grown and stored under very different conditions to today's crops; moreover, current recommendations only describe what happens under optimum conditions, when it may be just as useful to understand what happens when conditions are less ideal.

Once information is collated, initial information packs and an extension plan will be developed. The following stages of the project will be focused on making information easily available to growers, both in the form of resources and in hands-on workshops.

**Project VG13083**

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## Biogas generation feasibility

This project aimed to thoroughly explore the feasibility of biogas generation from organic waste on Australian vegetable farms. Extensive consultation with industry was undertaken, including case studies. The final report for this project was submitted in August 2014.

The feasibility of on-farm biogas generation will depend upon the specific context of each operation. However, the following key factors will influence biogas feasibility:

- Scale of operation: high amount of waste produced is preferable, generally greater than 25 t/day
- Crop type: different organic wastes produce varying volumes of biogas
- Logistics: costs and revenues associated with a farm's current waste management practices
- Consistency in feedstock and electricity use: consistency in both waste production and electricity use are preferred features.

The development of a feasibility tool would ensure the analysis undertaken in this project is available to the industry.

**Project VG13049**

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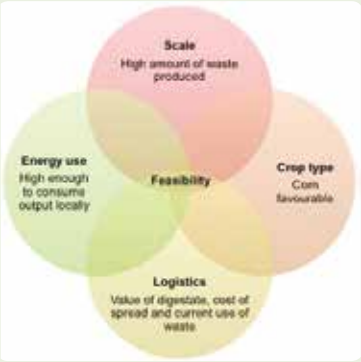


*Feasibility of biogas generation.*

# Enhancing market attitudes towards IPM and sustainable vegetable production practices

While research consistently shows that consumers care about environmental issues and are willing to pay more for sustainably grown products, it is difficult to grow sustainably while also ensuring zero insect contamination.

This project examined whether there is a market for an 'eco-label', how much consumers care about insects, and whether such attitudes could be changed through education and communication.

Four activities were conducted:

- A desktop review of sustainability labels and eco-farming schemes
- Eight focus groups
- A national online survey on attitudes to farming, the environment and insects
- Production of three videos explaining 'beneficial insects'.

Interest in buying sustainably grown vegetables was positively associated with vegetable liking, vegetable consumption, and interest in gardening. However, many consumers had little idea where or how vegetables were produced, especially if products were purchased from a supermarket and/or were pre-packaged.

Explaining the use of beneficial insects to control pests, as through videos accessible through QR codes on vegetable packaging, proved an excellent way to enlighten consumers.

**Project VG12084**

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*Filming Stuart Grigg at Fragapane Farms packing line.*

## Microwave postharvest disinfestation of insects

Fruit fly infestations limit the export market access of vegetable crops, with the export potential of some edible-peel vegetables further limited by the removal of the pesticide dimethoate from some pre- and post-harvest applications. This project aims to develop microwave technology as an alternative chemical residue-free fruit fly disinfestation technology.

Five microwave treatment (MWT) conditions were developed using a prototype microwave for zucchini and capsicum. They were infested with eggs – first, second and third instar larvae of *B. cucumis* and *B. tryoni* – and were treated with five MWTs. Three of the tested MWTs achieved 100 percent mortality in all life stages of *B. cucumis*, while none of the treatments were effective in attaining 100 percent mortality against *B. tryoni*. One MWT applied to capsicum was effective in achieving 98 percent or higher mortality in each life stage of *B. tryoni*.

Currently the research team is developing a new microwave system which aims to be continuous, fast, economical and chemical residue-free.

**Project VG12034**

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*Dr Xinqing Xu feeding the microwave unit with zucchini fruit (with fibre optic cables for online temperature measurement during treatment).*

# Producing fish food for aquaculture from vegetable waste

Australian consumption of fish and seafood has doubled in the last 10 years and is likely to grow. Demand needs to be met through aquaculture, where most species are fed, at least in part, on fishmeal; as fishmeal prices have more than quadrupled since 2000, this is expensive and unsustainable.

This project examined the potential to use vegetable waste to grow insect larvae for an alternative meal. The black soldier fly is an encouraging source due to the ease of harvesting larvae, and adults being neither pests nor disease-carrying as well as thriving in warm to hot conditions – such as spring-autumn in Queensland vegetable production areas.

A series of small trials found larvae could live on a variety of vegetables, with feed conversion rates estimated as 3.3:1. Adding ground flax seed not only raised the larval omega-3 fatty acid content, but also significantly increased conversion efficiency.

While results were promising, more research is needed into the field before commercialisation, with economic analysis suggesting that production would currently be a risky option.

**Project VG13050**

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*Black soldier fly mature larvae and pre-pupae.*

*Young BSF larvae consuming a capsicum.*

## Global scan for vegetable innovation - fresh and minimally processed

This research was commissioned to enhance the competitiveness of the fresh and minimally processed vegetable industry in Australia, with the aim of making growers more valuable in international markets.

A two-stage solution has been proposed to address this issue. The first is conducting a global scan of product innovations, followed by an identification of specific innovations to undergo further profiling. Each profile will include a summary of the innovation aspect, the conditions leading to the innovation, key steps on its path from inception to commercialisation and reasons for its success.

Innovations considered in the global scan may include packaging concepts, value-adding concepts, long life product storage and other post harvest innovations, commercially proven and market-ready new products and transport efficiency. This scan has been completed, compiled through extensive review of published information in more than 45 countries. The HAL project team is reviewing this list to shortlist up to 10 innovations for comprehensive profiling.

**Project VG13080**

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# Fenthion treatment of zucchinis against cucumber fly for quarantine

In the past, fresh Australian zucchinis have been exported to New Zealand following a quarantine treatment with fenthion. Recently, this treatment was banned by the Australian Pesticides and Veterinary Medicines Authority (APVMA), citing potential harm to the consumer and the environment. The aim of this project is to test a new method of treatment where low concentrations of fenthion are used against infestations of cucumber fly.

This new treatment will kill all eggs and larvae of cucumber fly. These data, along with product quality and pesticide residue data, are now under review by the APVMA. The Commonwealth Department of Agriculture will then negotiate with the New Zealand Ministry authorities to reinstate trade.

All insect efficacy results have been provided to the funding contributor, HAL and the APVMA, with a desired benefit of the resumption of trade of fresh Australian zucchinis to New Zealand.

**Project VG13066**

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# Benchmarking Australian vegetable industry points of difference

The Australian vegetable industry is exhibiting an interest in exporting greater quantities of vegetables, but to succeed in supplying the export market, it is essential to clearly identify any of Australia's potential competitive edges.

- Phase one: in-store audits/interviews (retail channel scanning)
- Phase two: polling over 1,000 consumers across five markets on their purchasing habits and perceptions of Australian vegetables – with the finding that Australia has an edge over competitors in Malaysia and Singapore in taste, packaging, labelling, nutritional value and pesticide-free
- Phase three: in-depth interviews with local players to better understand the positioning of imports within the region.

The project is currently at the last phase: regional market evaluation to generate recommendations for Australian growers to understand what attributes are required to succeed and give them an advantage in the export markets.

**Project VG13085**

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# Export projects

Developing international export markets has been identified as a key priority for the Australian vegetable industry and will be important in securing future profitability for Australian growers. Throughout 2013/14 the Australian vegetable industry heavily investigated potential export and trade markets and subsequently developed relationships with key representatives from these areas.

With a delegation sent to Asia Fruit Logistica in Hong Kong and key buyers represented at the 2013 and 2014 Reverse Trade Missions, the Australian vegetable industry has developed contacts with international counterparts. This was achieved through the following projects:

## Asia Fruit Logistica

Markets in Asia have been identified as the focus for local exporters given their proximity to Australia and opportunities provided through the counter-seasonality of our produce.

Asia Fruit Logistica (AFL) is the premier fresh produce event in the Asia-Pacific region and attracts international industry representatives, including importers and buyers representing major supermarkets. In 2013, AFL took place in Hong Kong (4-6 September) and attracted more than 6,500 delegates.

The AFL 2013 exhibition was an opportunity for the Australian vegetable industry to demonstrate the quality and safety image of Australian vegetables that has resulted from R&D investment. AFL 2013 also allowed importers, supermarkets and buyers to see examples of the R&D that supports Australian high quality produce.

Australian R&D was showcased at the Australian vegetables stand at AFL, which intended to bring buyers, importers, exporters and growers together to highlight the quality and safety of Australian vegetables as a result of R&D. A number of growers, researchers and industry representatives were present at the stand to communicate these messages.

Key outcomes of AFL were communicated to the industry through usual communication channels including *Vegetables Australia* and the AUSVEG Weekly Update. A database of key contacts was also developed by AUSVEG that is used to facilitate contact between growers interested in exporting and international industry members; this database is maintained as part of the general export readiness program and continues to be updated. A broader and longer-term implication of the project will be an increase in export of Australian vegetables to Asia.

## Reverse Trade Mission

The Australian vegetable industry's first Reverse Trade Mission (RTM), managed and implemented by AUSVEG, was held from 31 May–7 June 2013. Participating delegates in the Mission attended the 2013 AUSVEG National Convention and subsequently took part in visits to several Queensland and Victorian vegetable farms, wholesale markets and supermarket depots. Delegates were also involved in business meetings with individual Australian vegetable growers.

Being the first project of its kind, relationship building and developing close ties with a range of key vegetable industry stakeholders from Asia were key components of the mission. AUSVEG therefore developed


*Australian vegetable industry display stand at Asia Fruit Logistica.*

the program content of the RTM following consultation with a variety of organisations from both government and industry.

Delegates from Hong Kong, Japan and Malaysia represented numerous areas of the vegetable supply chain, including retail, hospitality, distributors and importers. The RTM was designed to introduce buyers to Australian growers and establish communication and relationships.

Following the success of the initial RTM, an expanded project was approved for 2014. The 2014 RTM followed a similar plan to its forerunner event, with 40 international delegates being exposed to high-quality Australian vegetables and given the opportunity to meet key growers with an interest in export.

Coinciding with the 2014 AUSVEG National Convention, Australian vegetables were showcased to buyers and industry representatives from Hong Kong, Japan, Singapore and Malaysia. Delegates were also afforded the opportunity to attend produce and wholesale markets in Brisbane and Melbourne and visited prominent growing operations in Victoria, giving further insight into the Australian industry.

The 2014 RTM again established direct contact between Australian growers and Asian exporters, facilitating connections which can be followed up post-event.

Long-term benefits for the industry received from the 2013 and 2014 Reverse Trade Missions will be a reduction in the level of hesitation surrounding exporting vegetables and, ultimately, an increase in Australian vegetable exports to Asia.

### Developing vegetable export opportunities in Asia and the Middle East

This project proposes to further develop export opportunities in Asia and the Middle East by taking a delegation of vegetable growers and industry members to exhibit at a range of trade exhibitions in Asian and Middle Eastern countries throughout 2014, showcasing the quality, freshness and safety of Australian vegetables to several key markets.

The majority of the delegation will be growers, however it will also include other industry experts and representatives. Exhibiting at these events also seeks to establish and develop business relationships between Australian growers and potential buyers.

Trade exhibitions in which the project will participate include:

- Asia Fruit Logistica (AFL) – The vegetable industry was represented at AFL in 2013, with many contacts made and relationships formed. Returning to AFL provides opportunity to build on these relationships, as well as make new contacts. AFL 2014 was held in early September in Hong Kong.
- Agritech Japan – Japan has been identified as a strong export market with the potential to overtake New Zealand as Australia's largest market. Showcasing at this event would facilitate business opportunities with a range of Japanese buyers, including key retailers such as AEON. This event was held in October 2014.
- WOP Dubai International Perishables Expo Middle East – The Middle East presents a significant export opportunity for the industry. With that in mind, exhibiting at a trade fair in a market such as Dubai where we already export to will provide opportunities to develop and expand business relationships in the Middle East.

This project seeks to further communicate the world-class qualities of Australian vegetables to representatives from key emerging fresh produce markets and to facilitate networking with these stakeholders. This project will further assist with the planned long-term increase in vegetable exports by Australian growers outlined as a goal in the Vegetable SIP.

**Projects VG12100, VG12101, VG13035 and VG13069**

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## Identify process improvements for preserving peak freshness of broccoli

In 2013, the vegetable industry commissioned a series of studies on consumer vegetable choices. Broccoli was a popular purchase, with its perception as a healthy, tasty vegetable; however, inconsistency in retail quality and shelf life prevented increased purchases.

The aim of this project is to determine whether there are issues with the retail quality of broccoli and, if so, to propose ways to potentially improve it.

While the project is in its initial stages, three main activities are planned:

- Assess quality and remaining useable life of samples purchased from a range of outlets
- Determine current supply chain practices
- Map supply chains to determine critical points, such as ascertaining whether broccoli is being transported at target temperature range.

Results will be available by the end of 2014. The final report will indicate whether the perceived inconsistencies in freshness of broccoli are specific to certain retail chains, or more widespread, with a major goal being to determine whether different practices would lead to an increase in sales opportunities.

**Project VG13086**

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# Investigating the physical supply chain to improve transport efficiency

Possible improvements along the physical supply chain to maintain vegetable quality and increase transport efficiency could be of significant benefit to growers. This investigation, formally commenced in March 2014, looks to identify and make recommendations on potential improvements.

The outputs delivered by this project are:

1. A map or diagram of the current infrastructure for all modes of transport of Australian leviable vegetables, from the grower to end users in Australia and export markets
2. A report on detailed findings from extensive consultation with all sectors of the supply chain involved in the transportation of fresh vegetables, including regulatory authorities, particularly where there are seen to be bottlenecks or other inefficiencies
3. Recommendations on improvements throughout the value chain that could deliver lower wastage levels, higher quality product and greater profitability through more efficient processes
4. An outline of the extension activities for information transfer and adoption of the recommendations.

As of 30 June 2014, the consultants had completed a number of interviews with stakeholders, including with retailers, wholesalers, growers, transporters, regulatory bodies, peak industry bodies and subject matter experts. The review of a large body of literature was well under way, with further interviews and desk research planned – the data from which will be subject to further analysis.

After completion of the project, the information found will be used to improve the supply chain, resulting in increased on-time, cost-effective delivery of produce at the highest possible quality. This will reduce waste along the supply chain and improve consumer satisfaction with Australian vegetables, leading to increased demand and greater profitability for Australian growers.

**Project VG13084**

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# Market Access and Development Program

Despite Australian growers being some of the most efficient and technologically advanced in the world, the Australian vegetable industry has historically been largely focused on the domestic market. The Vegetable Industry Market Access and Development Program has been commissioned to further develop vegetable market opportunities for the local industry by addressing export market impediments and to assist growers with an interest in export.

While Australian growers are advanced in terms of production practices and have the potential to export, only a small number are doing so, primarily due to a lack of clear opportunity, poor knowledge of the market and/or the perceived complexity of exporting.

The program plans to address a number of issues, including phytosanitary restrictions to market access, lack of competitive scale, understanding crop scheduling for supply continuity and knowledge and development of relationships in export markets.

Growers will be provided with the knowledge and tools required to overcome these impediments through market access information and guidance on both quarantine issues (particularly phytosanitary requirements) and non-quarantine issues (such as Free Trade Agreements).

Additionally, the program will help to create export market opportunities by showcasing the high quality of Australian vegetables to Asian and Middle Eastern vegetable buyers, as well as displaying the world class research and development completed by the Australian industry.

This point will be achieved through developing policies and procedures to provide market access information and guidance, the facilitation of regular Reverse Trade Missions to develop working relationships with international buyers, and the development of a communication and information database.

It is expected that this program will provide growers with clearer information regarding export markets and will assist in the development of best practices. The program aims to decrease hesitation and increase interest in exporting, in particular to Asian and Middle Eastern markets, which have been identified as having great potential for Australian producers.

**Project VG13097**

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# National honey bee pest surveillance program

The National Bee Pest Surveillance Program has become a world-leading bee surveillance program, with all states and territories (except ACT), as well as Commonwealth biosecurity staff, conducting a range of surveillance activities at around 40 ports across Australia. The project has vastly improved in the past financial year, with a continued increase in the number of sentinel hives routinely tested, as well as a greater incorporation of surveillance techniques conducted at high-risk ports.

There are a variety of benefits to pollinator-reliant plant industries in the maintenance and continued improvement of the program.

An incursion of Varroa mite would cost around $70 million per year over 30 years, with much of this cost falling on the honey bee industry and pollinator-reliant plant industries. By having a nationally coordinated early warning system for a variety of bee pests and pest bees, the chances of eradicating or containing an incursion improve greatly.

**Project MT12011**

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# An intelligent farm robot for the vegetable industry

This project aims to develop and demonstrate a ground robot with supporting intelligent software that has the capability of conducting farm surveillance for different vegetable crop varieties as well as conduct simulated trials of autonomous weeding.

The robot, 'Ladybird', was built and tested on a vegetable farm (Cowra, NSW). The trials were a success, demonstrating the solar recharging capability, its manoeuvrability on the farm, and the data-sensing, data-acquisition and mapping algorithms.

The project resulted in improved knowledge and understanding of robotic applications on vegetable crops. It also increased our understanding of how autonomous weeding could potentially be conducted leading to less chemical use with the potential for purely mechanical weeding.

**Project VG12104**

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# A model for industry planning and preparedness for an incursion of Varroa mite

Many horticultural industries rely on the pollination services of honey bees. An incursion of Varroa mite would result in significant reductions in wild bee populations, an unwelcome imposition on top of quarantine restrictions of managed hives which already threaten this supply.

This project aims to investigate contingency planning for a Varroa incursion, its potential impact, and pollination alternatives that could be used by industry to help manage a reduction in hive availability. It also aims to strengthen the partnership between pollination-dependent industries and bee keepers and to highlight the implications of emergency response operations.

As part of the project, a simulation workshop focusing on the potential impacts of a Varroa incursion on pollination was conducted in June 2014, using the almond industry as precedent. The exercise tested key findings of an initial review and increased understanding of the required roles, responsibilities and obligations of industries and governments under the Emergency Plant Pest Response Deed.

A final report will outline the recommendations from the industry review and outcomes of the simulation exercise to help providers and industry prepare effective responses to a Varroa incursion.

**Project MT12049**

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## Managing the nematode threat

Root knot nematode (RKN) (*Meloidogyne spp*.) is among the most destructive plant pathogens of vegetables and potato. Chemical control of nematodes is often expensive, and products have been removed from registration due to toxicity and environmental impact.

This project investigated an integrated strategy for RKN, which, along with other nematodes likely to be associated with yield loss, is common throughout Australia. A pre-plant soil DNA test to assess risk to potato from *M. fallax* was developed and tested by SARDI, and is now available to growers under the name PreDicta Pt. Other tests were developed for other RKN species.

The project also identified various break crops suitable for control of RKN species, and tested a farming system to suppress RKN based on reduced tillage, surface mulching, rotations and break crops. The efficacy of a range of new nematicides was also trialled. On completion of the project, a comprehensive web-based booklet on nematode management will be made available to growers.

**Project MT09067**

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*RKN feeding causes galls (swellings) and proliferation of secondary roots in carrot. (Image courtesy of S. Collins, DAFWA).*

# Combining superior eating quality and disease resistance in tropical super sweet corn

A significant proportion of sweet corn production in Australia is grown in tropical and sub-tropical environments. Tropical hybrids have the potential to grow well in warmer seasons and in environments where foliar diseases restrict the profitability of growing temperate-type hybrids. However, the success of tropical hybrids also depends on the development of disease-resistant germplasm that have comparable productivity and eating quality with temperate germplasm.

The goal of this breeding program, run by the Department of Agriculture, Fisheries and Forestry (DAFF), Queensland, is to improve eating quality and integrate effective disease resistance genes into agronomically acceptable genetic backgrounds.

Based on extensive tests over different seasons and sites, two candidate hybrids were identified. The parental and hybrid seeds were increased for subsequent on-farm verification trials by commercial partner Pacific Seeds.

Thirty-three hybrids were tested in a replicated trial at Gatton. More than 22 agronomic, quality and disease-related traits were recorded, with a priority placed on identifying quick flowering and smaller plant architecture. Ten hybrids were identified, each with a silking date of at least three days quicker than 'Hybrix5'. All have reduced plant size, good cob appearance, uniformity, flavour and tenderness. However, further work is needed to uplift productivity of the hybrids.

Seven parental lines were involved in the development of these hybrids and were evaluated for productivity and eating quality. This project has been completed, with parental lines identified in this project able to be used as good sources of desirable traits including agronomy, disease resistance and eating quality.

Downy mildew converted lines using molecular markers were evaluated for various agronomic and quality traits. About 10 lines were found to combine good agronomy and eating quality, with the potential to develop hybrids with superior agronomy and eating quality in addition to the introduced downy mildew resistance. However, the downy mildew resistance requires verification under field conditions.

**Project VG07198**

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# Integrating crop and soil insect management in sweetpotato

The combination of year-round Australian sweetpotato production, the stable subtropical environment of production regions and difficulties in managing volunteer regrowth all contribute to ideal conditions for continuous and rapid pest cycles. Industry relies heavily on the few currently-available insecticides, putting them under extreme pressure and risking the development of insecticide resistance in pests.

These factors point towards a need for innovation in integrated pest management (IPM). This project aimed to identify and trial new IPM systems through large-scale on-farm demonstrations, tests of pest-minimisation innovations, grower and industry learning events and identification and testing of 'soft option' IPM systems.

With 260 participants across 12 structured learning and awareness events, the project had a very successful rate of stakeholder engagement with learning activities. The implementation of such a broad program relied heavily on lead growers driving engagement with key tasks, including demonstration trials and the production of a 17-minute video featuring interviews on whole-of-crop integrated management strategies.

The project's R&D work program demonstrated on-farm new delivery methodology and new chemical compounds for IPM, as well as other improvements, including:

- Use of drip irrigation systems to deliver fipronil, which could potentially reduce the industry's dependence on bifenthrin
- Use of drip irrigation systems to deliver thiamethoxam: despite poor results, these trials identified two new compounds which could significantly reduce dependency on bifenthrin and chlorpyrifos
- Improved varietal tolerance levels to root knot nematode with two recently imported USA varieties, the germplasm of which could greatly improve Australian sweetpotato tolerance to major pests and diseases.

Due to the variety of crop development periods which growers manage to maintain a 12-month supply, the project has recommended that research needs to continue to identify and develop technologies that can be applied accurately throughout crop development time.

**Project VG09052**

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# Investigating the costs associated with the production, sale and distribution of vegetables

This project reinforces the critical relationship between scale, productivity and farm financial performance. Reducing production costs in the vegetable industry can have an important influence on both its domestic and international market share. The best-performing growers farm more area, produce more product per area and achieve a higher price per tonne produced, even while having the lowest cost of production (COP) per tonne. This indicates that increases in scale are offsetting the increases in farm costs, instead of coming at the expense of productivity.

The best-performing growers do not appear to have cost competitiveness issues; however, many small growers do not have the benefits of economies of scale. They suffer from high overhead costs and do not attract higher prices by producing a premium product, and are struggling to remain competitive. Therefore, it is critical to learn from growers who have been successful at lowering the costs of production.

This project identified the characteristics common to the best-performing growers, so that others could learn from them and improve their profitability. It also developed an industry investment strategy, which it recommended should be implemented to improve the performance of the entire industry, as well as a simple COP calculator for all growers to use, as a first step in implementing the strategy.

**Project VG12086**

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# Environmental effects of vegetable production on sensitive waterways

This project developed processes that enable vegetable farmers to address the environmental concerns of sensitive waterways at a farm and community level. This was achieved by identifying nitrogen 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 focused in several vegetable growing regions in Queensland and Victoria that are considered to have sensitive waterways.

The project completed nutrient budget surveys, replicated research trials and vegetable grower case studies over three seasons. The project is now completed and has developed several key publications and tools, including:

- A good agricultural practice guideline for vegetable farmers near sensitive waterways
- Vegetable nutrient removal calculator (Nutricalc)
- Fertiliser use efficiency: matching fertiliser inputs to vegetable crop removal
- Optimising nitrogen fertiliser use efficiency in vegetables
- A community engagement manual for vegetable production near sensitive waterways.

**Project VG09041**

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# Increasing energy efficiency and assessing an alternate energy option for protected cropping

This project has made it easier for greenhouse growers to reduce costs and make better energy investment decisions by providing them with easy-to-use tools for finding ways to save energy and evaluate the cost to benefit ratio of alternate energy systems.

The self-assessment audit pack provides a three-step process for identifying all energy-using equipment and systems on-site, calculates running costs over a year, and includes information on the low-cost options or methods that may be used to improve energy efficiency.

Through the comparison of three potential alternative heating technologies for greenhouses, analysis shows that significant energy and cost savings can be achieved through investment in non-conventional heating options.

A series of greenhouse energy (heating) estimator tools have been developed which calculate estimated greenhouse heat loads and provide a model for analysing the comparative energy costs.

All resources are available to growers on request.

**Project VG09124**

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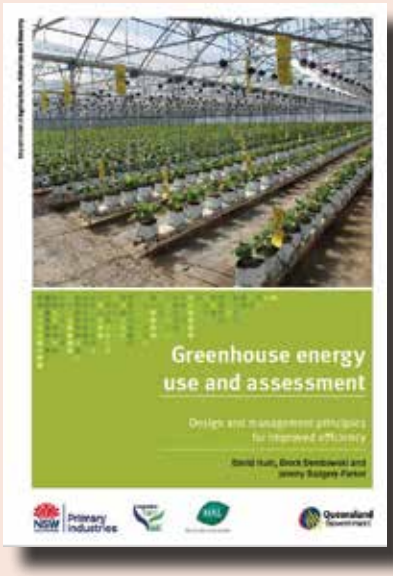

# Strengthening biosecurity for the Australian vegetable industry

This project was developed to ensure the industry has the ability to effectively engage with and respond to Australia's State and Federal Governments on a range of relevant biosecurity issues from an R&D and technical perspective.

Technical Consultant Dr Kevin Clayton-Greene continues to undertake activities as part of the project, which is now in its third year; these activities include liaising with the Department of Agriculture and the initiation of an emergency project as a response to tomato red spider mite incursion in the Sydney Basin.

Developments in biosecurity and actions taken regarding biosecurity issues are communicated to growers by AUSVEG via industry publications, such as the biosecurity column in the bi-monthly print magazine *Vegetables Australia*.

The Biosecurity Advisor will continue to participate in meetings with industry stakeholders regarding biosecurity issues and will keep the industry updated with technical advice.

**Project VG11013**

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# Movento label additions for lettuce, rhubarb, bulb vegetables and herbs

The Australian lettuce, rhubarb and herb industries consist of approximately 13,800 hectares combined, with the main sucking pests including aphids and thrips. However, there are few or no registered pesticide options for these pests.

Movento 240 SC Insecticide has been shown to be an effective insecticide for the control of pests in a wide range of vegetable and fruiting tree crops, which may have developed resistance to existing pesticide groups. Use during early stages of crop development will control aphids not directly contacted by non-systemic insecticides, and its effectiveness on thrips would also be useful in reducing feeding damage on stems.

The study also recommends that as more management tools for the control of thrips and aphids are developed, integrated crop management strategies and insecticide resistance strategies in vegetable production will need to be modified to ensure the sustainable management of these pests in the future.

**Project VG11039**

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*Movento trial site in spring onions, Heatherton, Victoria.*

# Continuing on-farm improvements through good practice demonstration and extension

Growers appreciate well organised, targeted and appropriately timed events to convey practical research with outcomes that can be applied to their business. Quality presentations delivered by respected and effective presenters are more effective when they include practical farming situations and allow for grower discussion.

This project provided both on- and off-farm demonstrations and activities designed to encourage grower participation and give them a sense of ownership of the discussions. Planning workshops allowed idenfication of themes growers wanted to learn more about and the resultant field days, farm walks, workshops and information night were consequently well-attended.

Surveys at the end of the project showed that 94 percent of attendees increased their understanding of the topics involved, with 100 percent indicating that they were able to introduce positive practice changes into their business; five case studies of these successes were published to encourage farmers to make their own improvements.

The project is also developing a calculator to assist growers in applying economic and environmentally-friendly amounts of fertiliser. This calculator is anticipated to be released on the WA Department of Agriculture and Food's website by the end of 2014.

**Project VG10082**

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# Managing pesticide use in horticulture

During 2013/14, 22 Strategic Agrichemical Review Process (SARP) reports were updated for beans and peas, beetroot, Brassica leafy vegetables, brassicas, carrots, celery, cucumber, eggplant, leeks, lettuce, parsley, peppers, silverbeet and spinach, snow and sugar snap peas, spring onion and shallot, sweet corn, sweetpotato, zucchini, pineapple, citrus, papaya and lychee. In addition, four new SARPs were undertaken for chestnut, melon, olives and avocado.

Before an agrochemical product can be sold or used in Australia, it first must be registered by the Australian Pesticides and Veterinary Medicines Authority (APVMA). Costs for generating and collating data for product registration are high but the APVMA's National Permit System adds some flexibility to the process and allows some products for minor-use purposes as long as data is submitted proving the use will be safe and effective.

Two crop safety trials were conducted to compare the bioequivalence of Betanal 157 EC (157gai/L phenmedipham) and Betanal 160 SE (160gai/L phenmedipham).

Data summaries were submitted to the APVMA to support new permit applications for the use of chlorothalonil during the seedling nursery phase and prochloraz in field-grown open-head lettuce.

Determination of gaps in pest and disease management tool options took place and the Australian vegetable industry then set about meeting those needs with the goal of preparing minor use permit applications. The project team researched and submitted information in support of the requested uses to the APVMA prior to the end of August 2013.

To ensure continuity of those permits for their users, a project (VG12114) is aiming to manage the off-label permits for the vegetable industry. Over the duration of the project, Growcom submitted 84 permits for renewal or new permits as directed. As a result, Growcom currently holds 178 permits on behalf of the vegetable industry.

**Projects MT10029, VG11025, VG11028, VG11033, VG12051, VG12052, VG12072, VG12073, VG12076, VG12114, VG13027**

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## Residue data

| Active ingredient | Crop | Organisation |
|---|---|---|
| Alpha-cypermethrin | Brassica leafy vegetable, radish, shallots, and spring onions | Agrisearch |
| Azoxystrobin | Lettuce | Agrisearch |
| Difenaconazole | Beetroot | Agrisearch |
| Dimethomorph | Protected structure-grown leafy lettuce, snow peas, spring onions, and sugar snap peas | Agrisearch |
| Lambda-cyhalothrin | Shallots, spring onions | Agrisearch |
| Maldison | Shallots, spring onions | Agrisearch |
| Methoxyfenozide | Sweet corn | Agrisearch |
| Propiconazole | Leafy vegetables | Agrisearch |
| Pyrimethanil | Field-grown and protected-grown snow peas | Agrisearch |
| Tebuconazole | Beetroot, chicory, spinach | Agrisearch |
| Toclofos-methyl | Lettuce | Agrisearch |
| Chlorothalonil | Silver beet, spinach | Crop Protection Research |
| Metalaxyl-M | Lettuce, broccoli | Crop Protection Research |
| Metalaxyl-M plus mancozeb | Capsicums, chillies | Crop Protection Research |
| Phosphorous acid | Rhubarb | Crop Protection Research |
| Trixlofystrobin | Celery and brassica leafy vegetables | Crop Protection Research |
| Abamectin | Capsicums, chillies, cucumber, eggplant, paprika, potato, squash, snow peas, sugar snap peas, sweet corn, tomato and zucchini | HAL |
| Bifenazate | Bitter melon, cucumber, eggplant, pepper, sin qua, snake bean, tomato and zucchini | HAL |
| Etoxazole | Capsicums, cucurbits, snow peas, sugar snap peas, and tomato | HAL |
| Hexythiazon | Beans, cucurbits, potato and tomato | HAL |
| Pendimethalin | Brussels sprouts | HAL |
| Alpha-cypermethrin | Leafy lettuce | AgriSolutions Australia Pty Ltd |
| Bifenthrin | Cucumber | AgriSolutions Australia Pty Ltd |
| Chlorothalonil | Capsicum | AgriSolutions Australia Pty Ltd |
| Maldison | Capsicum, cucumber, leafy lettuce | AgriSolutions Australia Pty Ltd |
| Prochloraz | Leafy lettuce | AgriSolutions Australia Pty Ltd |

| Active ingredient | Crop | Organisation |
|---|---|---|
| Trichlorfon | Cucumber, leafy lettuce | AgriSolutions Australia Pty Ltd |
| Clethodim | Bok choi, choi sum, kale, mustard greens | AgriSolutions Australia Pty Ltd |
| Fluazifop-p-butyl | Chicory, silverbeet | AgriSolutions Australia Pty Ltd |
| Imidacloprid | Beetroot | AgriSolutions Australia Pty Ltd |
| Ioxynil | Leek | AgriSolutions Australia Pty Ltd |
| Lambda cyhalothrin | Spring onions, shallots | AgriSolutions Australia Pty Ltd |
| Methabenzthiazuron | Parsley | AgriSolutions Australia Pty Ltd |
| Dimethomorph | Field situation: Leafy lettuce, baby spinach, English spinach, Protected cropping: bok choi, choi sum | AgriSolutions Australia Pty Ltd |
| Phenmedipham | Baby spinach, leafy spinach | AgriSolutions Australia Pty Ltd |
| Anthracnoze | Lettuce | Peracto Pty Ltd |
| Propiconazole | Brassica gai lum, chicory, endive, and radicchio | Peracto Pty Ltd |
| Ethofumesate | Spinach | Peracto Pty Ltd |
| Bentazone-sodium | Green peas | Peracto Pty Ltd |

## Integrating sustainable soil health practices into a commercial vegetable farming operation

Vegetable growers in Australia mainly use conventional cultivation methods, including rotary hoes and disc ploughing, which are expensive and damaging to soils. Improving soil health through the use of organic composts, biofumigant cover crops, legumes and minimum tillage will likely increase productivity, reduce costs and reduce disease.

This project aims to investigate the impact of sustainable practices on the profitability and disease severity of commercial leafy vegetable production in western NSW. As well as benefiting from these investigations, the industry also benefits from the subsequent communication of how to address key issues in soil sustainability.

Permanent beds, controlled traffic and minimum tillage trials have been set up on Mulyan farms in Cowra since 2009. The soil in these blocks is less compacted, has higher microbial activity and is in better physical condition than comparable soils cultivated normally.

Trials on nitrification inhibitors have shown promising results on increasing yield in processing lettuce. Additionally, the project has established a range of cover crops, which will be the focus of a field day in Spring 2014.

**Project VG12115**

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## Review of pesticide investment in the vegetable industry

Vegetable producers are aware of the small range of crop protection products and herbicide products available to them for efficient crop production. Many are aware that to achieve a wider range of products through permits or label extensions, passage through an expensive, time-consuming and complex minor-use programme is necessary, with no alternative programme likely to be implemented in the foreseeable future.

This review was commissioned to consider the potential for minor use system improvements for vegetable industries. The review recognised the limitations of the existing complex system which lacks industry ownership and focuses on renewals maintenance, rather than introductions of newer, softer chemistry.

A revised compartmentalised minor use system was recommended, and would see: the vegetable industry appoint an industry Minor Use leader with responsibility for industry requests and prioritisation; and industry education and engagement. The resultant nationally-prioritised list of researchable projects with industry, regulator and registrant approval, would then become the starting point for the recommended compartmentalised HAL projects and roles in data generation, permit management and strategic and tactical development. In addition, the review recommended structured decision-making with informed consultation and feedback loops, investment in resistance management, and national regulator activity around existing crop groupings, database access, fee and timeline incentives.

**Project VG12105**

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# Managing virus diseases in vegetables

This project investigated and communicated practical ways of reducing economic losses from virus diseases in vegetable crops, with an emphasis on capsicum and cucurbits.

Outcomes from the project include the identification of zucchini varieties with high tolerance to Papaya ringspot virus-type, demonstration of the value of floating row covers in preventing the spread of aphid-transmitted viruses in squash, and characterisation of Tomato spotted wilt virus strains originating from capsicum and other crops.

The project also confirmed that the three aphid-transmitted viruses in cucurbits in Australia are also spread by leaf abrasion and cutting during cultural and harvesting operations, and assisted in detection of Cucumber mosaic virus in volunteer capsicum plants, discarded fruit and several weed species at Carnarvon where this virus continues to cause economic losses.

A significant result for the project, the final report for which was accepted in July 2014, was the delivery to industry of information on virus disease management in vegetables.

**Project VG10104**

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*Capsicums with tomato spotted wilt virus.*

## Breeding capsicum for Tospovirus resistance

In collaboration with Syngenta Seeds Australia, this project is working to develop resistance to Capsicum chlorosis virus (CaCV) in elite breeding lines and new F1 hybrids.

Due to this project, the inheritance of CaCV resistance is now understood, and a series of elite resistant lines by plant house screening and hybridisation have been developed. The most advanced progenies will be evaluated for field performance with the intention of developing new F1 hybrids. A large number of early resistant F1 hybrids were evaluated in field trial in 2013, from which a small number of superior hybrids were identified.

Syngenta Seeds are continuing laboratory work to identify a genetic marker for the CaCV resistance gene based on resistance screening data. There are candidate markers already identified which will need to be verified by assay.

The parent lines and hybrids delivered by this work will provide the basis for new commercial cultivars with resistance to CaCV and Tomato spotted wilt virus.

**Project VG10081**

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*Resistance to capsicum chlorosis virus in greenhouse screening of capsicum breeding lines.*

# Review of vegetable SARP reports

In 2008, 2009, 2010 and 2011, the Pesticide Minor-Use Coordinator (PMUC), via the current Horticulture Australia Ltd (HAL) project MT10029 "Managing pesticide access in horticulture", prepared industry reports on the 'Strategic Agrichemical Review Process' (SARP) for each of the following vegetable crops:

- Beans and peas
- Beetroot
- Brassica leafy vegetables
- Brassicas
- Carrots
- Celery
- Cucumber
- Eggplant
- Leeks
- Lettuce
- Parsley
- Peppers
- Silverbeet and spinach
- Snow and sugar snap peas
- Spring onion and shallot
- Sweet corn
- Sweet potato
- Zucchini

Each crop / crop group was systematically reviewed for:

- Current plant pests (disease, insects, nematodes, weeds) that were of major concern were identified,
- Current pesticides available and use patterns,
- Pesticides at risk identified,
- Pest management 'gaps' identified,
- Future plant pests, and overall suitability of current pesticides (IPM, residues, efficacy, trade, environment) assessed.

A report was produced for each crop / crop group, with a list of pesticides solutions for each problem in the crop with the benefit of:

- IPM compatibility, resistance management and sound biological profile (where possible)
- Residue and trade acceptance domestically and for export (where possible).

The reports provide each industry commodity with a 'snapshot' of pest importance and pesticide use. It determines the effectiveness of current pest management options, pesticide availability in the future, IPM impact, environmental concerns, domestic and international trade concerns and biosecurity. It also recommended new pest management strategies.

The draft reports were prepared in 2008/09 and required a peer review by industry experts and stakeholders.

This project provided funds to the services of vegetable experts (consultants, retailers and/or government agencies) to review each of the 18 reports for:

- Pest priorities,
- Pesticide use, and
- Overall technical correctness.

**Project VG12081**

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# Managing biting fly in vegetable crop residues

Stable (biting) fly, which breeds in rotting vegetable crop waste, could produce significant social barriers to industry expansion. This project aims to minimise stable fly breeding through various cultural and biological techniques. In doing so, it also aims to improve the reputation of the vegetable industry by reducing the impact of stable fly on nearby animal enterprises and human activity, therefore reducing social barriers to expansion on the Swan Coastal Plain.

High-speed mulching of vegetable crop residues, along with a lack of overhead irrigation, clearly affect stable fly development – in conjunction with the use of beneficial fungi, proper management can result in an 80 to 90 percent reduction in stable fly development.

The Dikarya fungi, stimulated by applying bioaccelerants to crop residue after harvest or directly to the crop, can kill stable fly eggs. Other more specific products, such as Mycoforce™, contain three specific Dikarya fungi (*Beauveria bassiana, Metarhizium anisopliae*, and *Verticillium lecani*) that have reported impacts on stable flies. Application of Mycoforce and lime sand to residues reduced stable fly emergence by 50 to 60 percent.

A calcium cyanamide-based nitrogen fertiliser reduced stable fly development by up to 90 percent.

**Project VG12022**

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# Controlling multiple heading and transplant shock in lettuce

Blindness in lettuce is a condition that develops in the seedling phase and results in multiple heading in mature plants, causing the lettuce to be unsaleable. The condition is generally a problem for seedling propagators over regional summer periods.

Initial results show that high temperature is associated with inducing lettuce blindness and multiple heading, either on its own or in combination with other factors like low humidity and water stress. Increases in temperature during early seedling development result in increased blindness.

Interestingly, lettuce seedlings can overcome blindness depending on the timing, severity and persistence of conditions.

Trials are continuing, with additional studies investigating the impact of treatment with Imidacloprid (e.g. Confidor®) and Durivo® on the establishment of lettuce seedlings. The project will continue until January 2016. Upon completion, a fact sheet will be produced to help growers control these issues.

This project is a joint initiative between Applied Horticultural Research (AHR), Withcott Seedlings (Qld), Choice Seedlings (NSW), Boomaroo Seedlings (Vic) and Rjk Zwaan Australia.

**Project VG12017**

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# 2013 Emerging Technologies in Horticulture Seminar

The Emerging Technologies in Horticulture Seminar was designed to identify, demonstrate and expand upon advancements in technologies related to vegetable production, with a particular focus on technologies which might assist in mitigating issues predicted to impact Australia's vegetable production capability over the coming decades. Topics discussed at the seminar included agricultural biotechnology, optimised insect control, and innovative vegetable packaging.

The seminar had a positive impact on the industry, exposing growers to options for optimised mechanisation and use of technology on farms, and providing them with the opportunity to produce more efficiently and effectively. It is expected that the increased knowledge of on-farm machinery and agricultural science attained by growers will assist in maintaining Australia's high standards of production in the short, medium and long-term future.

The seminar was held on 30 May 2013 on the Gold Coast. A final report outlining details of the seminar, featuring a full list of expected outcomes, recommendations and delegate feedback, has been made available to the industry.

**Project VG12050**

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# Increasing productivity and extending seasonality in soil-grown vegetables

Already-high costs of capsicum production, crop establishment and harvesting are increasing, forcing growers to seek efficiencies and productivity gains. The aim of this project is to increase crop productivity and extend the productive life of capsicum.

A literature review into international capsicum production that has been undertaken to guide planned work has identified potential ways to improve productivity in Australia. Grafting and ratooning knowledge in the Australian climate is poor, and overseas experience with genetics local to those environments is not directly relevant, transferable, or applicable to our environment.

The project investigated the impact of grafting a widely used commercially available Australian capsicum, Warlock® (Seminis Seeds), on to:

- Overseas commercial capsicum rootstock
- Commercial robust chilli
- Soil disease-resistant commercial eggplant used in diseased soil of NT
- Commercial line (Warlock) grafted onto itself
- Commercial standard Warlock ungrafted for comparison.

There were observations made at the Gatton trial harvest. These observations included that the act of grafting has not decreased plant vigour or yield, that several grafting treatments reduced plant height and that marketable fruit yield from all treatments initially seems similar, but this data is yet to be fully analysed. A North Queensland field trial has also been established in Bowen in early July and has all the same treatments as the Gatton trial.

This work will provide industry with a commercial evaluation of the impact of grafting on yield, plant productive life, and rootstock impacts. Benefits will include better understanding of grafting interactions, disease resistance, and rootstock impacts on a commercial variety under Australian growing conditions.

A protected cropping component will investigate the performance and productivity of capsicum material in a covered cropping system, adding to knowledge of crop performance and suitability of this production system.

**Project VG12103**

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*Established (week 3) productive capsicum trial.*

*Mature trial (week 8) productive capsicum trial.*

*Mature crop.*

# Benchmarking study to assess vegetable industry biosecurity awareness and preparedness

Australia's relatively pest- and disease-free status greatly benefits our vegetable industry. To maintain this advantage over competitors, biosecurity measures need to be highlighted in all stages of vegetable production and sale.

This project was commissioned to obtain a better understanding of biosecurity awareness and preparedness in the vegetable industry through a combination of online and personal surveys.

The project found that there is biosecurity awareness amongst growers and service providers, but that this needs to be built upon to reduce its negative perception in business. While the transport industry agreed that vegetable biosecurity was important, there was a disconnect between this and their feeling of responsibility, with only half of respondents indicating they felt responsible for the maintenance of biosecurity.

The report suggests there are opportunities to improve both the uptake and the implementation of biosecurity practices. These include incentives to increase uptake of industry-relevant biosecurity programs, better integration of biosecurity practices within quality assurance programs and incentives to increase the adoption of programs.

**Project VG12085**

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# Management of insecticide resistance in the green peach aphid

The green peach aphid (GPA) is a widespread species attacking a broad range of horticultural crops. Unfortunately, this species has a high propensity to develop insecticide resistance, and achieving adequate control of resistant GPA is particularly challenging. This project aims to investigate the resistance status and movement of GPA across Australia, explore new approaches to control aphids and develop Resistance Management Strategies for GPA.

Since the project began, over 20 GPA populations have been collected from Queensland, Victorian and South Australian crops of capsicum, chilli, snapdragons, eggplants and cauliflower. These have been brought back to the laboratory and used to establish live cultures. Resistance bioassays for multiple chemistries have been discovered across a number of these; to date, the project has uncovered resistance to carbamates, synthetic pyrethroids and organophosphates across the majority of populations collected. The levels of resistance to carbamates and pyrethroids are quite high, and no doubt contribute to control difficulties and grower frustrations. The project has now developed DNA tools that allow it to screen GPA populations for key insecticide resistance mechanisms more cheaply and quickly.

The project has completed an industry survey to help identify resistance drivers and inform future Resistance Management Strategies for GPA. Approximately 100 respondents have now completed an online survey, which was publicised widely using networks across Australia. These results are yet to be analysed.

Going forward, the project will continue to assess the resistance status of GPA populations using a combination of genetic and pesticide bioassays. This will include the collection of further field populations.

This project will lead to recommendations about insecticide resistance management and improved control methods for GPA.

A key component of the work is the integration of field surveillance and aphid movement studies, which will enable long-term management and monitoring guidelines to be implemented across Australia.

**Project VG12109**

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*Green peach aphid.*

## Improving the management of insects in processed leafy vegetables

Insect contamination in fresh and processed produce is a significant recurring problem for leafy vegetable growers and processors. It causes rejections and lost sales for growers, adds cost for processors and results in bad publicity for retailers.

By its completion, this project will have developed and assessed better ways of reducing insect contamination in the field and in the factory.

The project has assessed the effectiveness of low-toxicity insect deterrent field sprays in Queensland and Victoria, as well as baby leaf harvester modifications and insect traps in the field. The project has also found that rotating drums effectively removes about 60 percent of insects.

The project is due for completion by the end of 2015, and will be entering its second year of testing this summer, with monitoring of insect levels, trials on floating row covers, and further factory assessments planned. Upon completion, the project will produce a how-to guide for growers explaining how to reduce insect contamination depending on the crop, insect and insect population.

**Project VG12108**

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# New virus diagnostics and planting bed management for Australian sweetpotato

The initial objectives of this project are discovering how sweetpotato growers currently manage their planting beds, and conducting a virus survey of sweetpotato growing regions in Qld and Northern NSW.

The first project team meeting with Australian Sweetpotato Growers (ASPG) and members from the Department of Agriculture, Fisheries and Forestry (DAFF), Queensland, was held in Bundaberg in April 2014. Team members also delivered two presentations to the sweetpotato industry at Lindsay Rural grower nights in Cudgen in March 2014, and in Bundaberg in May 2014. An allied presentation on sweetpotato partnerships with ASPG was delivered at an Innovation Seminar Event in Bundaberg in April 2014.

The DAFF sweetpotato team has visited almost 50 sweetpotato growers to discuss the new project and commence project activities. These growers have been comprehensively surveyed on planting bed practices and have provided sweetpotato material for baseline virus prevalence data. Around 120 sweetpotato samples have been collected from planting beds, surrounding crops and related weed species from growing regions in Rockhampton, Bundaberg, Lockyer Valley and Cudgen. Virus indexing of these samples and virus identification began in spring 2014, once the weather warmed to allow suitable plant growth and virus expression. The team has also visited five sweetpotato growers to discuss current issues with storage root splitting and virus management in specific crops.

Initial indications, based on survey responses and current literature, are that co-operators for research activities and partnerships will be readily available. Growers are keen to implement better planting bed and virus management practices, demonstrating the benefits of embedding the research, development and extension program within a focused and collaborative industry.

ASPG research team members recently hosted a very successful visit from Louisiana State University sweetpotato scientists to Queensland and Northern NSW in August 2014, as part of an ongoing commitment by the Australian sweetpotato industry to building international linkages and mutually beneficial information and resource exchanges.

**Project VG13004**

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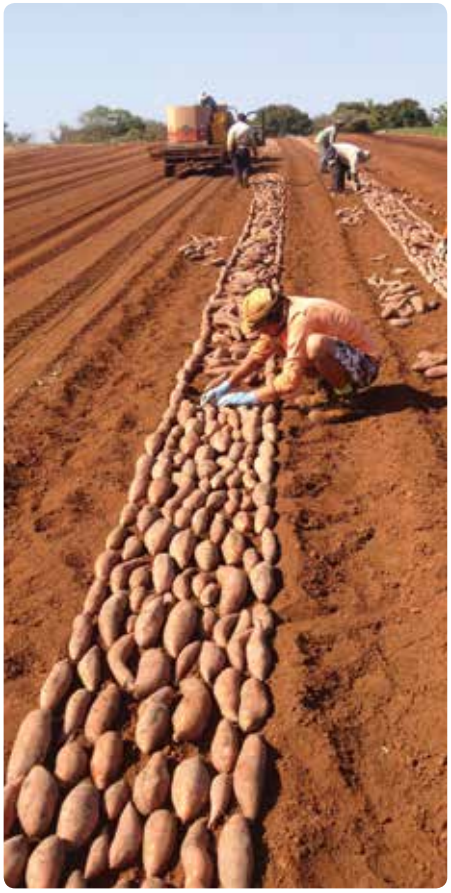

*Bundaberg growers establishing a sweetpotato planting bed to generate commercial sprouting material.*

*Bundaberg sweetpotato growers listening to a talk on sweetpotato virus testing.*

*DAFF project team member Craig Henderson (left) discussing sweetpotato plant bed management with Bundaberg grower Anthony Grima.*

## Remediation of soil contaminated by *Salmonella enterica*

Contamination of soil by human pathogens is a major challenge for the fresh produce industry, especially regarding its effects on fresh or minimally-processed produce. One such pathogen, *Salmonella enterica*, is the second-highest cause of food-borne disease in Australia, and improper use of animal manures during vegetable production is potentially a significant contamination source.

In collaboration with the University of California, Davis, USA, this project seeks to develop strategies to alleviate the soil presence of human pathogens. It aims to determine strategies to prevent crop contamination by enhancing die-off of *Salmonella* populations associated with poultry manure. The project will also trial the use of low-residue biofumigant cover crops, which release antimicrobial chemicals upon degradation.

As well as assessing *Salmonella* presence, the project will monitor environmental populations of other microbes to explore the potential to control other pathogens.

The project is currently the research phase, establishing the parameters governing *Salmonella* presence – the first time such a baseline has been made – and producing an understanding of conducive growth conditions, which will inform field trials scheduled to begin this summer.

**Project VG13039**

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# Improving grower access to new chemistry to control downy mildew

Downy mildew is a significant problem for growers in the lettuce and leafy vegetable industry. This project aims to register a low-risk chemical management option for the issue, addressing important management gaps identified by the Scheme for the Assessment of the Registration of Pesticides (SARP) review. The industry should benefit from improved chemistry, which will be registered for control of downy mildew in lettuce and leafy vegetable crops.

Two field trials evaluating the efficacy of SYNPRF8, a new fungicide for control of downy mildew in lettuce, were completed in 2013. In 2014, a further five trials have been established in crops in key growing regions of Australia. Interim results from the two lettuce trials in 2013 and one lettuce trial initiated in 2014 have shown that SYNPRF8 gave excellent control at a level equivalent to or superior than current industry standards.

A minor-use permit for SYNPRF8 for controlling downy mildew in lettuce and leafy vegetables was submitted.

**Project VG12112**

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## Weed Management for the Australian Vegetable Industry

Weeds are a persistent problem for many vegetable producers in Australia. The common features of vegetable cropping systems, including frequent cultivation, irrigation, and the addition of large quantities of nutritional inputs, mean that the potential for weed growth is high. Weeds have a significant impact on crop profitability, yield and quality, and crop management.

In consultation with the Australian industry, researchers sought to identify the most important weed species in Australian vegetable production and the methods currently used to control them, gaps in current knowledge of weed control, potential lessons from other industries, and the most important research, development and extension (RD&E) issues.

The project involved a review of the literature, a national survey of vegetable farmers, focus group meetings and farm visits in major vegetable producing regions across Australia, and key informant interviews.

The most commonly reported weeds of Australian vegetable production were generally annual or biennial broadleaf species. Examples of common weeds were fat hen, stinging nettle, mallow, pigweed, and nutgrass. These weeds predominate because they seed heavily, while grass and grass-like weeds are more easily controlled using selective herbicides.

### Weed Control Strategy

The current strategy of most farmers to control weeds in vegetable crops includes a mixture of herbicides, cultivation, hand weeding, plastic mulch (where applicable), and crop rotation. Other methods used with success by some farmers included fumigation and biofumigation, stale and false seedbeds, and farm hygiene.

Nearly all farmers integrate a number of control methods (Integrated Weed Management (IWM)), because no single technique alone will effectively manage weeds in the crop during the entire growing season. However, relatively less attention has been paid to refining IWM in vegetables than in broadacre cropping. This is concerning given that the grains and cotton industries have demonstrated that IWM is key to sustainable productivity.

**Project VG13079**

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# New in-field treatment solutions to control fruit fly

Queensland fruit fly (Q-fly) and cucumber fly pose a significant threat to production and market access of fruiting vegetable crops. In-field management has historically relied heavily on the use of broad spectrum cover sprays; however, recent restrictions in the use of fenthion and uncertainty regarding the future of dimethoate will make control more difficult and could prevent market access. Alternative treatment solutions are therefore required to ensure continued successful fruit fly control.

Semi-field trials were performed to evaluate a range of alternative chemical controls, namely Talstar (bifenthrin), Fastac Duo (alpha-cypermethrin), Confidor (imidacloprid), Samurai (clothianidin) and Benevia (cyantraniliprole), compared with dimethoate and an untreated control crop. Treatments were tested for efficacy against Q-fly in capsicum and against cucumber fly in zucchini.

All insecticide treatments reduced fruit fly infestation, with Samurai providing a level of control comparable with dimethoate. Dimethoate, Fastac Duo and Talstar resulted in comparatively higher numbers of aphids and whitefly, illustrating the impact of these broad-spectrum insecticides on integrated pest management.

**Project VG13041**

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Integrated crop solutions are being developed for fruit fly control through cage trials of new strategies and field trials are trialing previously lab-based methods. The project also plans to translate this research data into resources and tools for grower use.

The project will be largely guided by the information generated in project VG13040. A number of cage trials have already been conducted examining the effect of repellents; unfortunately, infestation rates were too low to draw conclusions. Planning is now under way for field trials, which will commence (along with data collection) in suitable locations once weather becomes sufficiently warm.

Scripts are also being developed for a series of short videos demonstrating aspects of fruit fly control (to be filmed summer 2014/15).

**Project VG13042**

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*Chilli plants treated with mineral oil, vegetable oil, kaolin clay and the water control inside a field cage.*

## Fruit fly research: gap analysis

Fruit flies are generally recognised as one of the world's most serious horticultural pests. They breed rapidly, disperse widely and attack most varieties of fruit and fruiting vegetables. The larvae destroy infested fruit, creating major quarantine barriers for both domestic and international markets. Fruit flies are also difficult to control, especially with the withdrawal of insecticides dimethoate and fenthion from most use patterns.

This project is conducting an extensive review of fruit fly research relevant to vegetable growers. Its aim is to identify promising strategies for further development, adaptation or extension. This will be used to formulate a three year road-map for strategic investment by the vegetable industry.

A draft review has been written describing fruit fly species of production and/or regulatory concern, regulation and monitoring of fruit flies, the influence of ecology and environment on behavior and how this can be used in control strategies, as well as pre-harvest and postharvest controls.

**Project VG13040**

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*Q-fly laying eggs into chilli fruit.*

# On-farm power generation options for vegetable growers

Australian vegetable growers are major electricity users, with electricity costing the average farm over $50,000 annually. As a method of reducing costs, a number of options for generating electricity on-farm are available to growers.

This project provides accurate estimates of costs and returns for generating electricity on-farm. Six case studies were used to examine how and where a range of options could be implemented, as well as the economic and regulatory factors surrounding them.

Case studies were conducted in Queensland, Western Australia and Victoria. A combined wind generation study was conducted in Tasmania, WA and NSW.

Initial results show solar generation to be economically viable, with internal rates of return mainly between 10 to 12 percent per annum – the highest at 20 percent – and payback periods ranging from 5.4 to 9 years.

Wind generation was viable in WA and Tasmania. Power generation using natural gas was also viable, provided the farm was connected to the gas distribution grid.

**Project VG13051**

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# Identifying potential alternatives to Metham Sodium

The continued reliance of the many vegetable growers on chemical soil fumigants such as Metham Sodium (MS) can largely be attributed to consumer demand for low-cost, quality vegetables. Unfortunately, the intensification of MS use has, in many cases, reduced inherent disease-suppressive properties in the soil, which in turn reinforces reliance on MS to deal with diseases, insects, nematodes and weeds. The greatest issue with the continued use of MS, besides human and environmental safety, is the development of enhanced biodegradation, which makes the product ineffective. This project focused on finding chemical and other alternatives to the use of MS to support vegetable producers.

When economic survival can be a year-to-year issue, many producers find replacing the use of MS with integrated methods that often take time to establish and require analyses of cost/benefit ratios over longer timeframes, challenging.

Through a desktop study and consultation with growers, advisers and researches, the project found a number of chemical alternatives to MS present their own problems with effectiveness, environmental impacts and biodegradation issues. The development of effective biocides appears promising, and the use of biofumigation can control soil-borne diseases and weeds; however, apparent immediate cost pressures may exclude these as options for many producers in spite of longer-term economic and environmental benefits and human safety.

The project found that extension needs to focus on improving the safe use of MS using existing resources and tools and on improving site-specific management capabilities for soil and crop health by educating growers and advisers on integrated management options including cost benefit ratios.

It also produced a number of recommendations for further RD&E into the area, including the registration of alternative pesticides and biocides, improving grower knowledge of MS effectiveness (especially enhanced biodegradation or resistance), and applied R&D on the practical use of integrated methods in systems that currently rely heavily on MS.

**Project VG13045**

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*Transparent polyethylene film applied to solarise a field.*

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

Infotech Research is conducting free on-site energy audits for 20 levy-paying vegetable growers around Australia, aiming to identify energy efficiency improvement opportunities for individual growers and the wider grower industry.

22 audits have been completed at farms in Victoria, Queensland, Western Australia, New South Wales, South Australia and Tasmania. The results from these audits have been compiled into a performance benchmarking report and three case studies. A further two case studies are planned.

As part of the project, Infotech has participated in six grower forums.

To date, project findings include consistent interest in energy issues by growers and electrical energy consumption, mostly from refrigeration plants and water movement across the farms. Electricity is generally the highest cost to growers, but diesel represents the highest energy input. Growers are cognizant of the costs of energy, and are seeking ways in which to reduce energy consumption through better energy management, energy efficiency and on-farm energy generation

**Project VG13054**

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## Soil-borne disease management diagnostics

This project aims to identify and prioritise R&D projects that will develop cost-effective, quantitative diagnostics tools for improved prediction of the risk of major soil-borne diseases for the Australian vegetable industries.

A two-day face-to-face workshop in Melbourne in mid-June brought together eight domestic and four international experts in soil-borne vegetable diseases discussing their diagnosis and detection techniques. Discussion and consensus identified a number of key pre-plant soil tests that could be developed which would identify and quantify the presence of economically important pathogens, including nematode and fungal species.

In conjunction with pathogen tests, other complementary tests involving beneficials and other non-biological surrogate measures would also provide a useful measure of soil health. This project will provide industry with a road-map and scientifically rigorous plan as to what specific diagnostic tools should be developed.

**Project VG13077**

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## Ultra filtration for low cost water disinfection and nutrient solution recycling

A disease-free source of water is critical to hydroponic production. The aim of this project is to confirm whether ultrafiltration offers a practical and feasible means of nutrient solution disinfection for growers of hydroponic vegetables, with the objective to test efficacy and evaluate the benefit to cost of this type of system.

A preliminary assessment of ultra-membrane filtration conducted by the NSW Department of Primary Industries identified a filter technology that appears to reliably remove pathogens and does not have typical blockage issues associated with fine pore filtration. The filter achieves this without interfering with nutrients in a recycled hydroponic solution and potentially at a lower cost than some other treatment options currently in use.

This project will provide hydroponic vegetable growers with clear information about how well these systems work to remove key pathogens from nutrient solution and what level of maintenance is required. A cost-benefit assessment of the technologies will be undertaken so appropriate and informed financial decisions can be made by managers.

**Project VG13052**

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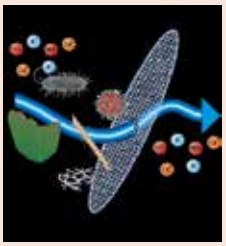

*Ultrafiltration icon image.*

# Building codes and greenhouse construction

This project aims to reduce the cost of compliance for the construction of Greenhouse/Grow Structures (G/GS) and to provide guidelines for a consistent building approval approach across Australia. The processes to deliver desired outcomes include the completion of G/GS field investigations, a literature review of national and international documents and consultation with professional fire engineers, building certifiers and global greenhouse manufactures.

Documentation of findings and recommendations made up the final stages of the project. The major benefit to the protective cropping industry consists of having a Code of Practice document that will assist certifiers/building surveyors when considering the approval of a new G/GS development, avoiding the sense of ambiguity which commonly occurs when assessing a G/GS against the National Construction Code.

By making reference to existing international standards and providing a Risk-Point Matrix Assessment document, this project gives a certifier the required tools to complete an assessment that is responsible and economically viable for the grower. It will also help provide a defined path to approval for an applicant grower.

**Project VG13055**

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*Crop protection structure with pervious membrane covering over a hydroponic lettuce crop.*

# Soil condition management – extension and capacity building

Healthy soil is the lifeblood of Australian vegetable producers, and most growers are keen to manage their soils in an environmentally and economically sustainable way.

In a recent survey, growers identified management of soil-borne diseases, biofumigation, interpretation of soil test reports and training in soil biology (such as organic supplements or activators) as key areas where they would like to improve their skills.

Growers also want information to be accessible, practical and relevant to individual commercial farming operations.

This project, jointly run by RMCG and AHR, aims to develop capacity among growers, agronomists and advisers. This will support soil management that achieves long-term crop returns for growers by delivering extension and capacity building using a focused approach.

The soil condition management project will primarily assist growers to effectively use existing soil management information rather than generate more information. The team will work closely with commercial agronomists, on-farm agronomists and with growers directly to help add capacity to agronomic support services in Australia.

The project will feature regionally based demonstration sites with thematic focuses, such as biofumigation/cover crops, biology/managing soil carbon, reduced tillage, nutrition management and soil-borne diseases. It will also provide reference sites for benchmarking and monitoring, and regional training and field days.

It aims to deliver:

- A sustainable extension system primed for up scaling, controlled by industry
- Agronomists supported, trained and linked to ongoing programs
- Demonstration sites to see benefits on farm (biofumigation, biology, reduced tillage, nutrition, disease)
- Improved resource use efficiency on farm resulting in reduced input costs (such as more efficient use of crop protection products, fuel and fertiliser)
- Increased productivity and higher marketable yield/packout from crops.

**Project VG13076**

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# An investigation of low-cost protective cropping

Prolonged heat waves and other extreme weather events can seriously impact vegetable quality, reducing grower profit and impacting supply continuity. Low-cost protective structures can potentially fill the gap between open-field production and full controlled-environment production.

These structures may allow for adaptation to more frequent extreme weather events, as well as enhanced crop quality, enhanced pest and disease management and an extended growing season.

This project will evaluate the potential of low-cost protected cropping through a desktop review, and then test the most promising methods in field trials. It is currently in the review phase, and the options being evaluated include shade houses, floating row covers, and portable structures.

The most promising of these options will be trialled on Australian farms over at least one season. The results of the review and trials will be communicated to growers and industry through field days, the production of educational resources, and personalised consulting to interested growers.

The project is due for completion in December 2015.

**Project VG13075**

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# Minor Use and Agronomy Coordinator – Minor Use Priorities and Awareness Program

The Minor Use and Agronomy Coordinator – Minor Use Priorities and Awareness Program aims to address issues pertaining to Minor Use permits and has been developed to increase communication, engagement and consultation with growers and Horticulture Australia Limited (HAL) as well as with other relevant industry stakeholders.

Under the program, AUSVEG works closely with HAL. One of the program's key aims is to establish and implement an effective process for vegetable levy payers to prioritise Minor Use permits and activities that are funded by the Australian vegetable industry.

Utilising the usual AUSVEG communication streams, such as the AUSVEG website, the Weekly Update and *Vegetables Australia* magazine, growers will be frequently updated on Minor Use news and developments, with additional plans for case-by-case communication streams such as fact sheets and information flyers.

In addition to this, the project plans to greatly increase engagement between growers, AUSVEG and HAL over Minor Use issues. This will be done through the implementation of a Minor Use workshop and symposium to each be held annually, as well as through regular on-farm visits with growers. AUSVEG plans not only to provide education to growers on Minor Use issues but also to act as a sounding board for growers.

This project aims to produce an increased level of awareness, engagement and input from members of the Australian vegetable industry on the Minor Use system and response options available to them within it. The project will ensure there is an effective process in place for the prioritisation of Minor Use permit options which address the industry's unique and changing crop protection needs.

**Project VG13096**

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# Effective management of parsley summer root rot

Grown on approximately 350 enterprises across Australia, parsley has a farm gate value of over $10 million. Root rot diseases have become a significant impediment to production in the previous decade, particularly during summer, when plants can rapidly collapse and die. This has led to market instability, often affecting contracts for other vegetables grown at the same enterprise.

This project recently commenced in June 2014 and aims to determine the primary causes of root rot and then develop integrated management strategies in response. A number of chemical, biological and cultural options will be evaluated using a participatory research approach from on-field trials conducted by growers and researchers. This will enable growers to choose effective management practices that suit their production.

Group activities are also planned to share knowledge developed from the research, as well as delivering best farm and hygiene practices to minimise pathogen spread. Education resources will be adapted from the highly successful cotton industry program 'Come Clean/Go Clean'.

**Project VG13101**

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# Nuffield farming scholarship

Under Project VG08012, three Nuffield Australia Farming Scholars completed a 16-week scholarship to travel overseas and study a topic related to the horticultural industry, then return and present their findings to their peers at the annual Nuffield Australia National Conference. Two scholars, Steve Newman and Hieu Minh Ly, completed their scholarships in 2013/14. Scholar Scott Samwell has concluded his research this year.

Scott conducted research into possible methods of growing brassica crops, specifically Brussels sprouts, in Australia by reviewing other practices around the world. Some possible alternatives were fusion farming, which forms a hybrid from positive attributes of other production styles, and using organic production systems. However, he found there is still work to be done to find a proper balance between these production methods.

Two scholarships were awarded for work in the Australian vegetable industry. Trent De Paoli and Emma Germano each completed research on different areas.

Trent De Paoli studied ways to value-add Australian horticultural by-products using new technologies or processes to create innovative products. Trent has completed his 10-week study tour and submitted his final report in July 2014, as well as reporting verbally to his peers at the Nuffield National Conference in September 2014.

Emma Germano studied global export opportunities for vegetables and how different countries approach the issue of export, including what government programs are available to growers.

She will now complete 10 weeks of individual study and report to her peers at the Nuffield Australia National Conference in September 2015, to be held in NSW.

**Project VG08012 and Project VG11001**

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*Emma Germano.*

*Trent De Paoli.*

## Economic survey of Australian vegetable growers

Annual economic surveys aid in developing long-term economic plans by collecting and disseminating data on the economic structures and financial performance of the Australian vegetable industry.

The results from these surveys are published as part of the Australian Bureau of Agricultural & Resource Economics & Sciences (ABARES) Industry Report series. These results, including average rate of return to capital and the annual differences in seasonal conditions, have informed industry and government on issues affecting the financial performance of Australian vegetable growers.

These results are the only source of data on both the physical and financial information of vegetable farms state-wide and nationally. They are used in briefings to HAL and state and federal governments, and are published weekly in AUSVEG's magazine *Vegetables Australia*. They are also freely available to growers and industry stakeholders on the ABARES website www.agriculture.gov.au/abares

**Project VG10047**

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# International study tours

Study tours to international growing and production regions in recent years have proved to be highly successful projects that not only expose local producers to the world's most innovative and advanced growing techniques, but also assist growers in building contacts with key researchers and industry leaders.

All vegetable levy payers are encouraged to apply for a place on each tour, with participants selected to represent many growing areas around Australia and from those who are most likely to share findings with other members of the industry. Tours are funded using the National Vegetable Levy and matched funds from the Australian Government, with attendees required to make a voluntary contribution.

The following tours involved multiple growers from around Australia learning from producers and researchers from many areas of the world – particularly Europe, the United Kingdom and North America.

### 2014 Europe Grower Study Tour

The 2014 Europe Grower Study Tour took place in February 2014 and provided eight vegetable levy payers with the opportunity to visit innovative vegetable producers, pack houses and researchers throughout Germany and France, as well as attend Berlin Fruit Logistica 2014, one of the largest fresh produce trade events in the world.

The main focus of the study tour was to educate vegetable growers about the latest production methods and business structures operating in Europe and to provide access – through Berlin Fruit Logistica 2014 and site visits to farming operations – to a range of networking opportunities involving importers and exporters, vegetable producers, the wholesale and retail trade and packaging and transport representatives.

The tour provided particular insights into the differences in the marketing of produce between Australia and France and the benefits that result for growers in France and Germany through strong export markets and a diversity of supply lines. Growers were also able to gain insight into new machinery, technology and growing practices that could assist in further improving efficiency in the local market.

### Vegetable Young Growers Tour 2012–2014

Young growers tours are designed to expose young leaders of the Australian vegetable industry to production, technical, marketing and supply chain systems operating internationally, as well as providing a valuable opportunity to make international connections and learn more about the characteristics of key international vegetable markets.

The 2013 tour saw nine vegetable levy payers head to Japan and Hong Kong to learn about production techniques and export development. In line with the new Vegetable Strategic Investment Plan (SIP), the Tour had a focus on both market development and production techniques in these countries, culminating with a visit to Asia Fruit Logistica, the pre-eminent fresh produce exhibition in the Asia Pacific.

The 2014 tour will see growers visit Japan again, as well as South Korea. The tour plans to visit mechanisation and robotic facilities and the Agri-tech exhibition in Japan, as well as a vegetable breeding research centre, Seoul Garak Market and importers while in South Korea.

### USA Grower Tours 2013–2015

This project sees the continuation of annual study tours to the USA for Australian levy paying vegetable growers for the years 2013, 2014 and 2015.

The 2014 USA Grower Study Tour provided nine vegetable levy payers from around Australia with a unique opportunity to learn from leading vegetable operations in the USA and Canada.

The inclusion of a visit to Canada came as tour organisers actively sought to include new operations which had not been visited by previous study tours to North America, while also incorporating operations and growing regions which have come highly recommended based upon feedback from previous tours.

Encompassing packaging, research and development, hydroponics, commercial horticulture and agricultural equipment, the 2014 tour gave Australian growers a first-hand experience with some of the most diverse and innovative operations in the USA and Canada.

Outcomes of this tour include insights and greater knowledge of waste efficiency, harvesting, processing, greenhouse and seedling management, as well as consumer insights and packaging.

### Women's Grower Study Tour 2013

The 2013 Women's Grower Study Tour provided nine Australian female vegetable growers with the opportunity to visit Italy and Spain to learn from some of Europe's most successful horticultural producers and industry service providers.

During the 14-day tour, participants had the opportunity to view both open field and protected cropping operations, engage in hands-on interaction with R&D innovations, tour wholesale markets, and convene with the international horticulture community at the MacFrut industry convention.

Attendees were able to develop an understanding of the processes necessary to increase their business size and scope, to the same effect of growers in Europe. Furthermore, the opportunity to export produce, and harness international trade relations, has been established.

Growers who participated in the tour will utilise the knowledge they have gained from visiting production and supply chain facilities in Spain and Italy, and furthermore, share these insights within the Australian industry.

### Carrot Grower Study Tour 2013

The 2013 USA Carrot Grower Study Tour provided 10 vegetable levy payers with the opportunity to visit leading and innovative carrot operations in the United States, and participate in a four-day International Carrot Convention covering all the elements of commercial carrot production.

The main focus of the tour was to educate growers about the latest carrot farming methods, technology, equipment and information. To achieve this over the eight-day tour, growers visited Bolthouse and Grimmway operations (America's two largest carrot processors and growers), toured Shiprock Farms in Wisconsin, and attended the 36th International Carrot Conference.

*continued on page 49*

Growers received exposure to production and supply chain systems operating in a country recognised as setting many benchmarks in horticulture. Through doing so, Australian growers gained knowledge on how to increase the efficiency of local operations and have since relayed information back to other members of the Australian vegetable industry.

### Women's Grower Study Tour 2014–2016

Following the success of the Women's Grower Study Tour 2013, further women's tours are being planned for 2014, 2015 and 2016.

The goal of the Women's Grower Study Tours is to link female growers in Australia to vegetable growers and other international companies associated with horticulture. Women are becoming increasingly important in the Australian vegetable industry, particularly in their roles of business support and finance.

Providing networking opportunities for key women growers and fostering this talent is therefore a key priority for the Australian vegetable industry and an area where knowledge provision can have considerable impact on-farm profitability.

This project proposes to incorporate visits in the USA during 2014, with destinations and itineraries for 2015 and 2016 to be determined closer to the date.

It is expected that the tours will foster future female leaders in the horticulture industry by providing opportunities for Australian participants to network with key international industry figures. Attendees will also gain knowledge and understanding of international horticulture best practice in vegetable growing, which will in turn be disseminated back to the wider industry.

**Projects VG11706, VG11711, VG12700, VG12706, VG12707**

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## Export-import market intelligence

Analysts at Horticulture Australia Limited are provided with official merchandise trade statistics of the horticulture sector of multiple countries through a subscription to the Global Trade Atlas database. This information is then reported back to AUSVEG.

The data in the system comes from the official reporting agencies in each country. It provides the value and volume of imports and exports for both those countries within the subscription, and the countries to which they import or export. The data allows analysts a view not only of what is being exported by Australia and its competitors, but also into key import markets to see how Australian products are comparing against their competitors in those markets.

**Project MT12009**

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## International networking for the Australian vegetable industry

This project provides a number of opportunities for leaders of the Australian vegetable industry to build connections and relationships with key stakeholders in different sectors of the global vegetable industry.

International networking not only creates opportunities for the industry to reach growing markets overseas, but also allows access to technological advancements which could enable local growers to improve the efficiency and effectiveness of their operations in the future.

With the world's population growing and a continued increase in global demand for food, it is imperative that Australia's local industry stays connected with international counterparts. This becomes increasingly important as exports begin to play a larger role in the growth of the Australian vegetable industry.

It is important to continue to engage and interact with the international community, as it not only develops the international profile of the Australian vegetable industry, but also fosters opportunities for members of the industry to learn from overseas practices.

**Project VG11707**

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# Production of Australian Vegetable Industry Vegenotes series

The Vegenotes series, which communicates the outcomes of completed R&D projects to growers, is an integral part of the National Vegetable Industry Communication Strategy. Vegenotes provides the opportunity for growers to take up and adopt outcomes and recommendations, an important end goal of R&D projects.

The bi-monthly publication provides growers with timely, technical and digestible information that stems from these R&D projects and can influence on-farm practices. Each edition of Vegenotes includes two articles covering two vegetable industry projects.

With print publications and face-to-face communications being the two preferred methods of communication for many growers, Vegenotes has become an effective and important print communication tool in order to translate outcomes of the levy investment to growers in an accessible format.

Vegenotes continues to be distributed and is sent to growers with the AUSVEG publication *Vegetables Australia.*

**Project VG12006**

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# Field Extension Officer for the Western Australian vegetable industry

The Field Extension Officer role in Western Australia allows for extension of research and development outputs and other important industry-related information to be communicated to the WA vegetable industry. Over the duration of the project, the officer role has developed trust though ongoing relationships and providing support over a period of time for growers to implement change. The role has been successful in providing a valuable feedback channel so that the industry stakeholders are always aware of issues important to growers.

As well as giving one-on-one support, the Field Extension Officer has successfully organised workshops, field days, information and training sessions, and facilitated the involvement of growers in many industry related development and educational opportunities. Through grower visits, group discussion and workshops, fortnightly e-news, quarterly grower magazines and constant contact with growers, the Field Extension Officer remains a valued source of information for growers and an important contact within the industry. This project is set to continue into 2015 and beyond.

**Project VG12026**

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*Field Extension Officer Sarah Houston with grower Joe Tedesco.*

# Vietnamese Field Extension Officer for WA

Approximately one-third of WA vegetable growers are Vietnamese, with poor or no English proficiency. To alleviate this problem, the Vietnamese Field Extension Officer at Vegetables WA provides extension of research and development and other information to Vietnamese growers.

The Officer has developed high levels of trust with community members, which allows him to provide the language and technical support required for Vietnamese growers to implement change. The Officer also facilitates communication between the Vietnamese grower community and other entities for matters such as HAL R&D projects, government programs and other private services.

The role provides a valuable feedback mechanism so that industry bodies are now aware of issues important to Vietnamese growers. Significant practice change and development rates within the Vietnamese grower community have been observed as a result of this project. Extension occurs through one-on-one visits and discussion, workshops, translation at industry meetings and forums and English and Vietnamese articles in the WA Grower magazine. The project is ongoing.

**Project VG12024**

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# National Vegetable Industry Communication Strategy (VICS) management and implementation

The Vegetable Industry Communication Strategy (VICS) is now well-established as an integral part of industry communication, delivering timely, concise and valuable information on the vegetable industry to growers around Australia.

Facilitated by AUSVEG, VICS continues to ensure that growers are updated on R&D outcomes and industry news and current issues. As R&D projects are funded by the vegetable levy, it is vitally important that growers can access information resulting from the projects and gain full value from R&D investment.

As part of VICS, AUSVEG continues to produce various print-based communications, including the Vegetable Levy Brochure and Grower Success Story booklets. In addition to this, AUSVEG has recently increased digital communication with growers by utilising Twitter and frequent email updates. This assists in increased engagement with growers all over Australia and ensures broader access to R&D and project outcomes.

VICS also utilises the Australian media landscape to increase engagement with the wider community and voice industry issues and concerns.

Through regular media releases, AUSVEG achieves frequent coverage on print, radio and television around the country.

AUSVEG continues to update and maintain its national database of vegetable growers that have access to content generated through VICS.

Since its inception, VICS has been highly successful and well-received by the industry, and the strategy continues to grow. This is reflected in the support of the Vegetable IAC and the level of contact AUSVEG now has with the vegetable growing community around Australia. AUSVEG will continue to monitor the success of VICS, evaluate the adoption of research and development outcomes which have been communicated via the strategy, and communicate with the growers through all available channels.

**Project VG12014**

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*Grower Mr Thang Le and Vietnamese Field Extension Officer, Truyen Vo.*

# Implementation Officer and Design Team

Under this project, an Implementation Officer has been appointed within AUSVEG as the Design Team Coordinator (DTC). The DTC undertakes activities associated with adoption of resolutions made by the three Design Teams, which each address a key strategic priority area as outlined in the Vegetable Industry Strategic Investment Plan (SIP): Farm Productivity, Resource Use and Management; Consumer Alignment; and Market and Value Chain Development.

The DTC acts as the secretariat during Design Team meetings, coordinates venue hire and travel, and ensures there are adequate resources in place to follow through with the adoption of new projects.

Working closely with a counterpart within Horticulture Australia Limited (HAL), the DTC also assists with the tender process to ensure that projects are written that meet the specifications and objectives of the industry, as well as accord with the resolutions made by the Design Teams.

Design Teams are a fundamental cog in the process of initiating new projects that fit with SIP requirements. This project is vital in enabling appropriate resources to ensure industry adoption, through the formal Industry Advisory Committee (IAC)/HAL investment process, of the key projects suggested by the Design Teams. It is imperative that the resolutions of the Design Teams are properly and comprehensively considered at IAC level and that all decisions are followed through to their conclusion.

**Project VG12036 and VG13018**

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# Extension service for the Victorian vegetable industry

The aim of obtaining this voluntary contribution funding from Horticultural Australia Ltd (HAL) was to enable the Vegetable Growers Association of Victoria (VGA Vic) to engage the part-time services of an Extension Officer to expand the communications activities of the Association.

As a result of the additional funding, VGA Vic Extension staff were able to produce four magazines in addition to the 26 In the Field publications which were distributed to members and associate members. These publications cover Association matters, as well as R&D activities and other industry issues. Staff also attend many meetings and events and kept growers informed of matters relating to their business.

The magazine, In the Field publications and VGA Vic website are the main communication vehicles for VGA Vic and Victorian growers and stakeholders. Grower visits have also been conducted to distribute information on behalf of researchers and other agencies.

**Project VG12107**

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# Vegetables Australia Magazine

Since its inception in 2005, Vegetables Australia has established itself as an integral part of the vegetable industry's communications strategy. The bi-monthly publication is widely regarded by growers and industry stakeholders as a vital method of communicating R&D developments and industry news.

Each edition either reaches or surpasses the magazine's quota of R&D information per issue, and the Circulations Audit Board has independently verified that the publication is the most widely distributed magazine in Australian horticulture.

Recent regular articles that have been added to the magazine include the biosecurity feature Frontline, and the Export Update, which provides growers with the latest information regarding exports. Veggie Bites, Young Grower Q&A, Enviroveg, EnviroNews and Around the States continue to feature in the magazine.

Vegetables Australia is currently in the second year of its current project term and a mid-term review has been provided to HAL.

**Project VG12033**

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# Growing Leaders 2013-2015

The three-year Growing Leaders project delivers a national industry leadership program every year. The program is developing the leadership skills and potential of the vegetable industry, ensuring individuals from a broad cross-section of industry are encouraged and supported to develop their leadership capability. It also encourages cross-sector understanding within the vegetable industry to ensure that businesses and industry organisations are populated with skilled individuals. Growing Leaders has been developed, managed and facilitated by Rural Training Initiatives, while AUSVEG and many industry businesses provide in-kind support. Growing Leaders is guided by an industry advisory group who meet quarterly via teleconference.

The project is addressing the lack of leadership capacity within the industry through the skilling and networking of the minimum of 15 participants. There will be intakes of participants in 2013, 2014 and 2015, raising the number of leadership graduates through the Growing Leaders program to well over 100 since 2009. Many graduates are now in positions of responsibility in businesses and industry organisations throughout Australia. The Growing Leaders 2014 program was completed in September 2014, by which point the participants had built a network through 20 industry events, delivered a vision for the industry through a six-month project, commenced two individual mentoring relationships and experienced over 30 skill development workshops.

The project is currently over-delivering in many key project outputs. Participants remain appropriately divided between fee-paying value chain participants (25 percent) and fully-funded growers (75 percent).

**Project VG12053**

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*Participants in 2014 program with AUSVEG's Jordan Brooke-Barnett (second from left) and program manager Jill Briggs (far right).*

# Enhancing best practice in the Northern Territory

The aims of this project are to build relationships within the vegetable growing community and review the current practices in the key regions around Darwin and Katherine, with a long term plan of improving growers' knowledge and applications of best practices.

The project has identified current commercial and training pathways, as well as acknowledging individual growers as 'industry champions', and has used these pathways to approach growers to determine current practices. Training activities conducted in collaboration with AgVet Chemical User led to a very successful field activity; the activity highlighted effective spray coverage on trellised vegetable crops while using air-assisted sprayers at one of the Vietnamese growers' properties in the Darwin rural area.

The event was attended by 19 Vietnamese vegetable growers and supported by two key commercial suppliers.

The project continues to identify areas of current practices that can be improved toward best practice and forging strong links with growers and their support industry.

**Project VG12113**

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## Barriers and drivers of vegetable consumption and purchase

Review Partners was commissioned in 2013 to review the effectiveness of three research projects to gain a better understanding of the attributes that drive and inhibit the purchase and consumption of vegetables.

Each research project was conducted by a different research company and looked at consumer trends around two vegetables each: broccoli and pumpkin; cauliflower and green beans; and capsicum and Asian greens.

The evaluation revealed that while each project had been carried out professionally and broadly in accordance with the brief, growers of different commodities received very different levels of analysis and reporting of the barriers and drivers to consumption of their vegetables.

To improve the process in future, Review Partners recommended a best practice approach to further studies, including maximising the collaborative involvement of industry to ensure that results are focused on practical outcomes. Review Partners also developed a briefing format to provide future research agencies with clear requirements and ensure that all growers receive comparable findings.

**Project VG12092**

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# Export opportunities for carrots, sweet corn, beans, broccoli and baby leaf – symposia

This project focuses on the delivery of symposia on export opportunities for carrots, sweet corn, beans, broccoli and baby leaf greens. The symposia will revolve around studies undertaken on Malaysia, UAE and Japan, and will be largely based on the results from projects VG13046 and VG13047.

Expected outcomes of the project and symposia include networking opportunities for both domestic and international representatives and the communication of information regarding exporting commodities to Malaysia, the UAE and Japan. Cultural barriers, freight and negotiation are among the issues planned for discussion.

Vegetable levy payers will be eligible to attend the symposia, with priority given to those who are looking to export, or already do so. The symposia will predominantly feature information relating to Malaysian and UAE markets, as Japan has been covered by the levy-funded project VG13034 Japan Export Symposium. If deemed necessary, however, further content on the Japanese export market will be considered for presentation.

It is expected that the project will contribute to a long-term increase in vegetable exports by Australian growers.

**Project VG13072**

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## Graduate Alumni Industry Network (GAIN)

GAIN aims to bring graduates from leadership programs of the vegetable industry together into a formalised Alumni. GAIN adds value to outcomes of the leadership activities funded by HAL by providing alumni with an after-project network to draw upon, and incorporates vegetable industry graduates from Growing Leaders, Next Generation, ARLP, Nuffield and Churchill. GAIN is being managed by Rural Training Initiatives but is being developed and delivered by the GAIN Steering Committee, made up of leadership program graduates who meet quarterly.

The project aims to deliver five key activities:

1. Regular social media presence on three platforms
2. A monthly discussion topic on issues impacting on the industry
3. An annual webinar on a topic identified through the monthly discussion
4. An annual GAIN planning and social gathering and field trip, in connection with the AUSVEG Convention in Cairns in June 2014
5. Facilitation of a GAIN response to key industry issues, delivered to industry organisations.

**Project VG13036**

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*Jill Briggs, Deana Said, Craig Arnott, Geoffrey Foster and Michelle Foster discussing industry issues at GAIN.*

# Coordinated Knowledge and Industry Development Program

The Coordinated Knowledge and Industry Development Program (CKAIDP) ensures that key areas of industry knowledge and development are communicated comprehensively and in a cost-effective manner to growers and industry stakeholders.

The program covers the key areas of knowledge management, industry economics, and consumer and market research information.

The InfoVeg R&D database has continued to act as a central R&D information source for growers. It features reports and fact sheets that can be easily accessed on desktop, mobile and tablet platforms, providing growers with constant accessibility.

A further InfoVeg initiative, InfoVeg Radio, was launched in mid-2014. InfoVeg Radio, a podcast broadcast over iTunes and SoundCloud, represents an important growth in both communication outlets and the content covered, with each episode featuring interviews with researchers, growers and other industry stakeholders.

The economics program continued to provide growers with in-depth and comprehensive analysis of up-to-date economic data and trends, using data sourced from government departments such as the ABS and the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES).

Project Harvest, a consumer and market research service, provided growers with reports and insights into consumer trends around fresh vegetable consumption utilising reports from multi-national research firm Colmar Brunton. AUSVEG continued to communicate the outputs of the project and provide feedback on its future direction.

**Project VG12071**

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## Plant Health Plan for the vegetable industry

This project aims to assist the Vegetable Farm Productivity (FPRUM) Design Team in implementing the Plant Health and Crop Protection RD&E Plan produced by project VG12048.

Over 2013/2014, the FPRUM Design Team developed several project concepts during a workshop, using materials prepared by the project manager to assist the team to understand context and formulate goals and project concepts for submission to the Industry Advisory Committee (IAC). The IAC subsequently agreed on several RD&E project briefs that were released for tender and have been contracted

On 18 February 2014, the IAC agreed to form a sub-committee to meet with the project manager to discuss the proposed project 'Vegetable Industry Reference Farm Network' in further detail. As a result, a brief for a proposed project will be prepared by HAL.

The benefits to the industry from this project include well-designed, outcome-focused and well-delivered RD&E projects in the area of plant health and crop protection. These projects will have clear goals, the required extension component and include evaluation of outcomes.

**Project VG13025**

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# Updating and republishing valuable vegetable industry resources

Despite industry bodies producing a huge range of grower resources over the years, many are no longer available, despite still being relevant today.

This project aimed to collate and review available resources and prioritise them for updating and republishing. Despite difficulties in locating some material, 300 resources were collated.

An initial review suggested that the most useful tools and resources aided identification, provided information on how to perform tasks, were easily accessible in the field, and remained up-to-date. This process has resulted in two printed “ute guides” for brassica and babyleaf vegetables, available free of charge to vegetable growers and their service providers.

The project has also launched an app, Veg Pest ID, with an aim to provide pest and disease information whenever and wherever it is needed, with regular updates available. The next stage will focus on expanding the information on the app, such as adding specific pictures of crops. If possible, this extra information will be used to produce a third pest and disease identification ute guide.

**Project VG12087**

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*The pest ID app is free to download from the App store.*

## Extension of integrated crop production information

This project will design and implement an integrated crop protection (ICP) extension program for the Australian vegetable industry. Progressing growers and other relevant stakeholders along the ICP continuum towards increasingly advanced levels of implementation and adoption on farms around Australia is one way of achieving sustainable and cost effective crop protection.

There is currently an extensive amount of ICP information from previous HAL projects and investment that can be built upon. It is important that this information is accessible, practical and relevant to individual commercial farming operations, rather than generating more information.

This project aims to work with growers, advisors and other industry service providers to:

- Improve awareness, knowledge, capacity and decision-making about pests, weeds and diseases
- Improve management of chemicals (Good Plant Protection Practice [GPPP])
- Apply Integrated Pest Management (IPM)
- Improve management of pests, weeds and diseases appropriate to the farming system (ICP).

The planning stage, completed in June 2014, included preliminary consultation with the Project Reference Group, industry, service providers, researchers and growers. A detailed needs analysis and further extension activities will be undertaken as the project progresses through to May 2017.

Project activities will be adjusted and refined on an annual basis to ensure the needs of growers and the industry continue to be met. This will enable the Australian vegetable industry to respond to the current and future crop protection challenges and opportunities.

**Project VG13078**

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## 2014 Japan Export Symposium

While vast amounts of Australian vegetable growers have identified Japan as a potential significant export market, these is also a need for clear advice on market access options and increased knowledge of the market's produce requirements.

The 2014 Japan Export Symposium, held on 22 June 2014 in Cairns, provided growers with insights into the nuances of the Japanese market and allayed any concerns or reservations that growers may have. The symposium provided growers with solutions to many of the obstacles surrounding exporting to Japan in the hopes of spurring an increase in future exports and helping the Australian vegetable industry grow into the future.

All presentations have been made available online to ensure that all levy payers can benefit from the information provided at the seminar.

**Project VG13034**

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# Vegetable industry WHS resources

Growers are often confused about their responsibilities, as well as where and how to implement a workplace health and safety (WHS) system. This project aims to provide practical WHS resources and training to growers with the end goal of increasing WHS compliance in the vegetable industry, thereby resulting in safer vegetable farms.

Project activities include a review of current industry WHS practices and state legislative requirements, development of WHS policies for vegetable farms and packing sheds, development of risk assessment frameworks, the provision of packages of customisable WHS resources to growers, and training sessions and risk-assessment farm walks with growers.

The project has consulted with vegetable growing businesses across Australia to understand current approaches and implementations of WHS. In industry, a spectrum of WHS practice exists; at one end are compliant and focussed businesses which are making workplace safety a priority, and at the other, those ignorant of the requirements and which have no systems in place whatsoever. Our consultation revealed that the main barriers to adoption of a WHS system were:

- Knowledge: growers find the volume of knowledge required being onerous; growers also dislike compliance in general
- Resources: growers fail to dedicate scarce time and resources to WHS
- Cost: a perception that implementing WHS is expensive
- Management skill: some growers do not possess the necessary management skills to implement a system
- Poor understanding of risk: some growers felt that WHS only applied to big corporate businesses and those accidents 'will not happen to me'.

The project is currently seeking levy-paying grower participants from across Australia who are interested in training workshops, farm risk assessment walks and obtaining copies of the WHS resources. The training activities will occur in late 2014 and early 2015.

Anticipated outcomes include practice change in industry, increased WHS awareness, WHS system implementation and safer workplaces.

**Project VG13053**

**For more information contact:**
**Luke Rolley, RMCG**
**T 0407 505 362**
**E luker@rmcg.com.au**

## Vegetable industry Academy of Excellence

This project is an ambitious initiative which should raise the Australian vegetable industry to a higher standard. The aim is to make it easier for growers to get the know-how and understanding they want.

A scoping study is investigating the knowledge needs of growers, developing useful courses and devising delivery mechanisms for growers to receive this knowledge. Initial courses proposed include those teaching business management, negotiation skills, IT and understanding modern consumers.

The focus on excellence recognises the increasing professionalism of vegetable production in Australia, and the challenges facing the vegetable industry. This project aims to establish the Academy in a position to maintain its presence into the future, and this establishment needs to be on solid educational and industry principles for its continued success. The scoping study was presented at the end of September 2014.

**Project VG13059**

**For more information contact:**
**Dr Denis White, Stride Consulting**
**T 03 9889 1127**
**E dmw@stride.com.au**

# Financial performance of Australian vegetable farms

The Australian Bureau of Agricultural & Resource Economics & Sciences (ABARES) surveys of vegetable growing farm businesses are designed to collect comprehensive production and financial performance data, production intentions and industry issues.

The 2013/14 financial year saw the public release of two ABARES reports entitled *Australian vegetable growing farms: An economic survey, 2011/12 and 2012/13* and *Trends in the Australian vegetable growing industry: 2005/06 to 2012/13.*

Data for the 2014/15 vegetable industry report was collected between March and June 2014, and is set to be released in late 2014. The 2013/14 survey results extend on the six surveys that have previously been collected for HAL, which have been used to inform the industry and government in policy forums including: the Australian vegetable industry Strategic Investment Plan 2012–17, AUSVEGs's Vegetables Australia magazine, the Tasmanian Fruit and Vegetable Industry Taskforce and briefings to the Minister for Agriculture.

**Project VG13068**

**For more information contact:**
**Haydn Valle, ABARES**
**T 02 6272 2065**
**E haydn.valle@agriculture.gov.au**

## Enhanced influencing and negotiation program

The vegetable industry has identified a number of training needs across the industry. A training program by ENS International was funded by HAL using the National Vegetable Levy and matched funds from the Australian Government to address a key identified need – negotiating skills. Using this investment, ENS International has produced two workshops; the first was held in Melbourne, and second was held in late September in Brisbane.

After the running of the workshops, ENS has conducted one-on-one coaching sessions with each workshop participant for between 30 and 60 days. Eight and nine participants ran through each workshop, with the end product of 17 vegetable growers having completed the negotiating training by the conclusion of the project. These growers will be equipped with valuable skills to both increase their standing in the industry and improve their bargaining relationships with other industry members.

**Project VG13064**

**For more information contact:**
**Annie Le, ENS International Pty Ltd**
**T 02 9249 3315**
**E ale.ens@negotiate.org**

## Export Readiness Program

The Export Readiness Program was designed to build the export capability of Australian vegetable growers by providing industry-specific export readiness advice, as well as resources to help growers understand what skills and knowledge are required to successfully export to overseas markets.

As part of the program, six export seminars were held around Australia, giving growers the opportunity to hear from AUSVEG on key markets and global trends that are likely to affect future export demand for fresh produce. AUSVEG also produced the Export Readiness Checklist, a tool provided to growers to assist them in preparing for export.

The program not only increased growers' interest in exporting, but also delivered an enhanced understanding of the necessary requirements to export successfully; it is expected that as a result, growers will now be more capable in both preparing for export and targeting international markets. A full report has been made available to the industry.

**Project VG13067**

**For more information contact:**
**Richard Mulcahy, AUSVEG**
**T 03 9882 0277**
**E info@ausveg.com.au**

# Guest worker scheme desktop study

While Australia currently operates a seasonal worker program (SWP), awareness of the program's policies and availability to individual growers remains low. This project aimed to produce a report that could assist the vegetable industry with further developing policy platforms and strategies regarding the employment of guest workers – as well as produce suggestions to improve the profile of guest worker programs in Australia.

The study considered the guest worker programs already implemented in various countries with similar market characteristics to Australia, and also considered the range of schemes currently available in Australia, with a view to analysing improvements that could be made on current Australian guest worker schemes.

The produced report made a variety of recommendations, including the increased education of horticulturalists about the SWP, the introduction of a mediation service to assist growers and workers in resolving differences, and the expansion of countries in the SWP.

**Project VG13063**

**For more information contact:**
**Richard O'Brien**
**T 02 6241 7828**
**E richardaobrien@gmail.com**

# ABS survey of additional vegetable commodities 2013

The Australian vegetable industry requires statistical information on vegetable commodities. The ABS surveys currently collect information from a limited number of commodities as part of their surveys; as a result, there is no information on a large number of commodities. As part of this project, the Australian Bureau of Statistics (ABS) will cover the following 25 additional vegetable commodities under the 2013/14 Rural Environment and Agricultural Commodities Survey:

- Alfalfa sprouts
- Asian vegetables
- Baby spinach
- Beetroot
- Broccoli
- Broccolini
- Brussels sprouts
- Cabbages
- Cauliflower
- Celery
- Chillies
- Cucumbers
- Eggplants
- Leeks
- Parsley
- Parsnips
- Peas – Green
- Pumpkins
- Radish
- Spinach
- Silverbeet
- Swedes
- Sweet corn
- Sweetpotato
- Zucchini and butter squash

The information to be collected will include: area sown (hectares or $m^2$), total production (kilograms or tonnes), and gross value of production. Outputs will be provided at the national, state, and regional level (in Natural Resource Management Regions and Australian Agricultural Environments). Estimates will be available in mid-2015.

**Project VG13071**

**For more information contact:**
**Iris Hall, Australian Bureau of Statistics**
**T 03 6222 5861**
**E iris.hall@abs.gov.au**

# Vegetable Industry's participation at the International Horticultural Congress, Brisbane, August 2014

The International Horticulture Congress is a global event held every four years that brings industry experts from around the globe to a diverse range of plenary sessions, symposia and workshops covering a wide range of horticultural areas.

The key objectives of this project are to expose a wide range of Australian vegetable industry representatives and stakeholders to the content available at the event, and allow networking with some of the world's most prominent researchers. This will allow benefits to flow back to growers and the broader industry, and assist with the future development of R&D concepts.

With this year being just the second time in the Congress' 150 year history that it was held in the southern hemisphere, the opportunity to attend was highly recommended to potential delegates. A group of 24 participants from around Australia were selected to attend; due to the scientific nature of the Congress, positions were allocated to applicants with relevant expertise and backgrounds.

The International Horticulture Congress 2014 was held on 17-22 August in Brisbane.

**Project VG13707**

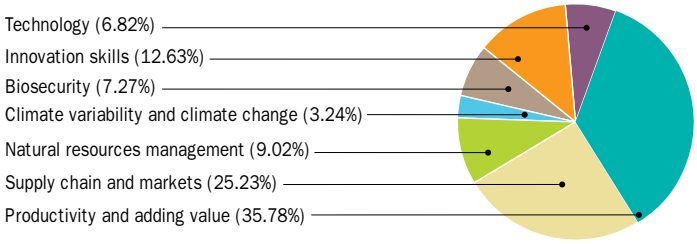
**For more information contact:**
**Richard Mulcahy, AUSVEG**
**T 03 9882 0277**
**E info@ausveg.com.au**

# Australian Government priorities

As part of the Australian Government's commitment to rural research and development (R&D), horticulture industries can access matching Commonwealth funding though Horticulture Australia Limited (HAL) for all R&D activities.

The Australian Government's Rural R&D Priorities aim to foster innovation and guide R&D effort in the face of continuing economic, environmental and social change. HAL's operations are closely aligned with these priorities.

This chart shows the percentage of expenditure in HAL's vegetable industry R&D program against each of the Australian Government priorities for rural R&D. Full details of expenditure across all industries is available in HAL's annual report at www.horticulture.com.au.




### Productivity and adding value

Improve the productivity and profitability of existing industries and support the development of viable new industries.

### Supply chain and markets

Better understand and respond to domestic and international markets and consumer requirements and improve the flow of such information through the whole supply chain, including to consumers.

### Natural resource management

Support effective management of Australia's natural resources to ensure primary industries are both economically and environmentally sustainable.

### Climate variability and climate change

Build resilience to climate variability and adapt to and investigate the effects of climate change.

### Biosecurity

Protect Australia's community, primary industries and environment from biosecurity threats.

### Innovation skills

Improve the skills to undertake research and apply its findings.

### Technology

Promote the development of new and existing technologies.

# Consultation funding

The consultation agreement between AUSVEG and HAL sets out the tasks each organisation will perform to enable the other to discharge its responsibilities related to levy payers and industry services.

Consultation agreement activities are funded by HAL using the vegetable R&D levy and matched funds from the Australian Government.

These funds enable AUSVEG to undertake the Annual Levy Payers' Meeting, conduct IAC meetings, attend HAL Industry Forums, HAL/AUSVEG Executive Board to Board consultation meetings, and other formal and informal consultation between personnel of AUSVEG and HAL.

The full year consultation funding expenditure for AUSVEG in 2013/14 was $834,108. This represents 5.2 per cent of the total annual levy expenditure.

**Project VG13910**

**For more information contact:**
**Richard Mulcahy, AUSVEG**
**T 03 9882 0277**
**E info@ausveg.com.au**

# HAL's roles and relationships

Horticulture Australia Limited (HAL) is a not-for-profit industry owned company. Its role is to manage the expenditure of funds collected by the Australian Government on behalf of horticulture industries.

In 2013/14, HAL invested more than $100 million in projects to benefit horticulture industries.

An Industry Advisory Committee (IAC) is established for each industry with a statutory levy and annual income exceeding $150,000.

The Prescribed Industry Body (PIB) for an industry is responsible for recommending to HAL the establishment of, and any changes to, statutory levies. The PIB for an industry with a statutory levy recommends membership of the IAC to HAL and must demonstrate how the skills required on an IAC are met by the persons they recommend for appointment to the committee.

For more information please visit www.horticulture.com.au.

# ACROSS INDUSTRY PROGRAM

The vegetable industry contributes funding towards an across industry program that addresses issues affecting all of horticulture. Details of the current program are listed below. A full report of the program can be found at www.horticulture.com.au/industries/across_industry_program.asp.

| Project no. | Rural R&D priorities | Project title | Levy or VC | Project start | Project finish | Life of project value | 2013/14 expenditure | Organisation | Contact |
|---|---|---|---|---|---|---|---|---|---|
| **Objective 1: To enhance the efficiency, transparency, responsiveness and integrity of the supply chain** | | | | | | | | | |
| AH12009 | | Partnering Fresh Produce with Retail - Quality Assurance Harmonisation | Levy | 1/8/12 | 31/8/13 | $143,500 | $212 | Kitchener Partners | Tristan Kitchener 0407 827 738 |
| AH12010 | | Partnering Fresh Produce with Retail - Joint Working Groups | Levy | 1/8/12 | 30/11/14 | $305,000 | $43,446 | Kitchener Partners | Tristan Kitchener 0407 827 738 |
| AH12015 | | Food Innovation Hub | Levy | 9/5/13 | 31/8/13 | $28,166 | $5,633 | Food Innovation Partners | Russel Rankin 07 3289 4591 |
| AH12016 | | Partnering Fresh Produce with Retail: Quality Assurance Harmonization | Levy | 15/5/13 | 30/6/15 | $337,307 | $105,096 | Kitchener Partners | Tristan Kitchener 0407 827 738 |
| AH13026 | | Retailer In-Store training | Levy | 16/12/13 | 30/5/14 | $20,000 | $20,000 | Kitchener Partners | Tristan Kitchener 0407 827 738 |
| **Objective 2: Maximise the health benefits of horticultural products in the eyes of consumers, influencers and government** | | | | | | | | | |
| *No active project in 2013/14 to report on* | | | | | | | | | |
| **Objective 3: Position horticulture to compete in a globalised environment** | | | | | | | | | |
| AH09027 | | Investing in Youth Successful Scholarship Applicant | Levy | 31/5/10 | 31/3/15 | $80,000 | $10,000 | Rural Industries R&D Corporation | Margo Andrae 02 6271 4132 |
| AH11009 | | Autonomous Perception Systems for Horticulture Tree Crops | Levy | 1/5/12 | 27/11/15 | $599,500 | $120,000 | University of Sydney | Dr Salah Sukkarieh 02 9351 8154 |
| AH12019 | | Horticulture Leaders - Across Horticulture Leadership Training - 2013 and 2014 programs | Levy | 3/6/13 | 31/5/15 | $184,323 | $50,000 | Strategic Business Development Pty Ltd | Russell Cummings 0414 929 585 |
| AH13018 | | Horticulture R+D Showcase | Levy | 1/8/13 | 30/6/14 | $46,889 | $35,680 | Horticulture Australia Limited | Brenda Kranz 02 8295 2317 |
| AH13020 | | Horticulture Information Unit | Levy | 1/8/13 | 28/2/16 | $250,000 | $31,000 | Horticulture Australia Limited | Pat Abraham 0438 474 758 |
| AH13028 | | Australia Fresh - Across Industry Initiative | Levy | 16/12/13 | 30/12/14 | $50,000 | $44,789 | Oliver & Doam | Agnes Barnard 02 8011 4743 |
| MT12029 | | Horticultural Market Access Manager 2012 - 2015 | VC/ Levy | 1/10/12 | 30/9/15 | $613,500 | $74,839 | Lawrence Consulting | Sam Lawrence |
| **Objective 4: Achieve long term viability and sustainability for Australian horticulture** | | | | | | | | | |
| AH09003 | | Plant protection: Regulatory support and co-ordination | Levy | 1/7/09 | 30/5/14 | $995,061 | $243,225 | AKC Consulting Pty Ltd | Kevin Bodnaruk 02 9499 3833 |
| AH09014 | | Across-industry climate research, development and extension (RD&E) activities | Levy | 13/4/10 | 28/2/14 | $60,264 | $12,000 | Horticulture Australia Limited | Brenda Kranz 02 8295 2317 |
| AH10003 | | Horticulture component of the National Climate Change Research Strategy for Primary Industries | Levy | 30/11/11 | 1/7/15 | $157,500 | $0 | Horticulture Australia Limited | Brenda Kranz 02 8295 2317 |
| AH10006 | | Pesticide spray drift in horticulture - a response to new guidelines from the APVMA | Levy | 1/7/10 | 30/6/14 | $20,000 | $4,676 | Horticulture Australia Limited | Jodie Pedrana 0404 314 751 |
| AH11007 | | Developing an LCI database for Australian agriculture | Levy | 2/1/12 | 1/10/13 | $20,000 | $10,000 | Rural Industries R&D Corporation | Brenda Kranz 02 8295 2317 |
| AH11010 | | Biotechnology Awareness in Horticulture | Levy | 10/10/11 | 30/6/14 | $102,177 | $9,941 | Horticulture Australia Limited | Alok Kumar 0418 322 070 |
| AH11011 | | Horticulture funding of the CRC for Plant Biosecurity | Levy | 30/6/12 | 30/5/18 | $3,000,000 | $500,000 | CRC For National Plant Biosecurity | John Austen 02 6201 2882 |
| AH11029 | | Provision of independent technical and secretarial services to the National Working Party for Pesticide Application | Levy | 20/12/11 | 31/5/15 | $100,000 | $25,000 | Plant Health Australia | Nicholas Woods 02 6215 7704 |
| AH13014 | | Horticulture for Tomorrow Review & Upgrade | Levy | 5/8/13 | 23/6/14 | $43,228 | $43,196 | Horticulture Australia Limited | Brenda Kranz 02 8295 2317 |
| AH13023 | | Industry Development Forum with International Horticulture Congress | Levy | 17/2/14 | 30/6/15 | $45,100 | $2,923 | Horticulture Australia Limited | David Low 0429 221 443 |

# ACROSS INDUSTRY PROGRAM

| Project no. | Rural R&D priorities | Project title | Levy or VC | Project start | Project finish | Life of project value | 2013/14 expenditure | Organisation | Contact |
|---|---|---|---|---|---|---|---|---|---|
| AH13025 | | Research to Support HAL Member Input to the HAL Review | Levy | 18/11/13 | 28/2/14 | $43,399 | $43,647 | Horticulture Australia Limited | John Madden 0421 274 076 |
| AH13027 | | Plant protection: Regulatory support and co-ordination - Continuation of AH09003 | Levy | 31/5/14 | 1/7/18 | $892,748 | $25,000 | AKC Consulting Pty Ltd | Kevin Bodnaruk 02 9499 3833 |
| AH13032 | | Response to Agricultural Competitiveness White Paper | Levy | 1/4/14 | 30/4/14 | $31,500 | $31,500 | KPMG | Michelle Pawley 02 6248 1141 |
| MT10029 | | Managing pesticide access in horticulture (cont from AH04009 and MT07029) | Levy | 1/7/10 | 2/7/15 | $1,261,460 | $67,398 | Horticulture Australia Limited | Jodie Pedrana 0404 314 751 |
| MT10049 | | A multi target approach to fruitspotting bug management | Levy | 1/3/11 | 1/4/16 | $1,353,016 | $40,741 | Department of Primary Industries NSW | Ruth Huwer 02 6626 1196 |
| MT10066 | | Project Coordination for MT10049 | Levy | 14/3/11 | 31/5/14 | $42,984 | $1,214 | RCR Agri Pty Ltd | Chaseley Ross 0409 707 806 |
| **Objective 5: Other** | | | | | | | | | |
| AH11003 | | Support Function for AIC | Levy | 15/9/11 | 30/8/13 | $84,187 | $35,000 | Horticulture Australia Limited | Warwick Scherf 02 8295 2323 |
| AH11017 | | Sponsorship of Appetite for Excellence Awards | Levy | 1/7/11 | 22/6/14 | $70,500 | $20,000 | Horticulture Australia Limited | Melissa Smith 02 8295 2340 |
| AH11023 | | Graham Gregory Award and Function | Levy | 1/7/11 | 30/6/16 | $151,500 | $30,000 | Horticulture Australia Limited | Sharyn Casey 02 8295 2379 |
| AH11026 | | Across Industry Program Administration | Levy | 1/7/11 | 30/6/14 | $31,800 | $6,332 | Horticulture Australia Limited | Warwick Scherf 02 8295 2323 |
| AH13800 | | Across Industry Annual Report 2012/13 | Levy | 1/7/13 | 30/6/14 | $15,000 | $9,688 | Horticulture Australia Limited | Barbara Knezevic-Marinos 02 8295 2318 |
| MT12028 | | OHMA Operational Support 2012 to 2015 | VC/ Levy | 1/10/12 | 31/5/15 | $91,500 | $19,594 | Horticulture Australia Limited | Peter Whittle 0409 578 937 |
| **Horticulture Australia Transformational Fund projects** | | | | | | | | | |
| AI12002 | | Transformational Solutions to challenges and issues facing the Australian horticulture industry | Levy | 9/9/13 | 1/10/14 | $500,000 | $250,000 | Intellectual Ventures | Paul Levins 0419 239 180 |
| AI13001 | | Dietary sterilization of male Queensland Fruit Fly (QFF) | Levy | 1/5/14 | 28/2/18 | $1,253,316 | $100,000 | CSIRO Biosecurity Flagship | Dr Christopher Hardy 02 6246 4375 |
| AI13004 | | Transforming subtropical/tropical tree crop productivity | Levy | 5/11/13 | 31/5/17 | $3,089,012 | $652,026 | Department of Agriculture, Fisheries and Forestry, Qld | Dr John Wilkie 0402 390 885 |
| AI13008 | | A platform for the continuous genetic improvement of accepted cultivars of vegetatively propagated horticultural crops | Levy | 14/11/13 | 31/1/17 | $2,025,439 | $354,981 | Queensland University of Technology | Dr James Dale 07 3138 2819 |
| AI13011 | | Transformational Innovation Performance Analysis | Levy | 1/10/13 | 31/12/14 | $146,635 | $117,308 | University of Queensland | A/Prof Damian Hine 07 3346 8162 |
| AI13012 | | A Value Chain approach to horticultural product innovation | Levy | 20/12/13 | 31/12/14 | $265,430 | $112,544 | Central Queensland University | Philip Brown 07 4150 7145 |
| AI13013 | | Direction setting Forum for a horticultural education strategy | Levy | 24/2/14 | 30/7/15 | $15,000 | $7,968 | Horticulture Australia Limited | Sharyn Casey 02 8295 2379 |
| AI13014 | | Advancing Post Doctorates in horticulture | Levy | 1/6/14 | 30/4/18 | $800,000 | $0 | Horticulture Australia Limited | Sharyn Casey 02 8295 2379 |

**Australian Government Rural R&D Priorities:** Productivity and adding value, Supply chain and markets, Natural resource management, Climate change and climate variability, Biosecurity, Innovation skills, Technology

## CLIMATE CHANGE RD&E

Throughout 2013/14, the Australian horticulture industry invested in a range of research, development and extension (RD&E) projects to better understand, adapt to and mitigate the impacts of climate change.

Horticulture Australia Limited (HAL) has invested in cross-collaborative programs, such as the Climate Change Research Strategy for Primary Industries (CCRSPI) and Agricultural Lifecycle Inventory (AusAgLCI), and projects within or across industries, such as on crop phenology, nitrogen and plant-waste management, regulated deficit irrigation, carbon and soil, urban forestry and environmental auditing.

HAL's RD&E investment is obtained through industry levies, voluntary contributions and matched funds by the Australian Government.

# VEGETABLE PROGRAM

| Project no. | Industry obj | Rural R&D priorities | Project title | Levy or VC | Project start | Project finish | Life of project value | 2013/14 expenditure | Organisation | Contact |
|---|---|---|---|---|---|---|---|---|---|---|
| HG12716 | 4 |  | Protected Cropping Australia National Biennial Conference 2013 | VC | 29/5/13 | 30/9/13 | $100,000 | $20,000 | Protected Cropping Australia | Graeme Smith 03 5427 2143 |
| MT09067 | 3 |  | Managing the nematode threat | VC/ Levy | 1/10/09 | 31/8/13 | $1,397,052 | $16,278 | Tasmanian Institute of Agriculture, University of Tasmania | Dr Frank Hay 03 6430 4907 |
| MT10029 | 3 |  | Managing pesticide access in horticulture | Levy | 1/7/10 | 2/7/15 | $1,261,460 | $66,665 | Horticulture Australia Limited | Jodie Pedrana 0404 314 751 |
| MT11023 | 3 |  | Generation of data for pesticide registrations or minor-use permits in allium crops | VC/ Levy | 1/10/11 | 30/5/15 | $175,209 | $17,913 | Crop Protection Research Pty Ltd | Dale Griffin 03 9775 4230 |
| MT12004 | 2 |  | Improving efficacy of MAT to enhance area-wide management of Queensland fruit fly | Levy | 1/11/12 | 30/9/15 | $240,000 | $12,000 | Macquarie University | Dr Phillip Taylor 02 9850 1311 |
| MT12009 | 4 |  | Export-Import Market Intelligence 2012 - 2014 | VC/ Levy/ Mk | 15/7/12 | 30/6/14 | $140,122 | $2,587 | Global Trade Information Services Inc. | Russell Patterson 1 803 765 1695 |
| MT12011 | 3 |  | National honey bee pest surveillance program | VC/ Levy | 15/5/13 | 30/4/15 | $146,372 | $68,171 | Plant Health Australia | Rodney Turner 02 6215 7720 |
| MT12028 | 2 |  | OHMA Operational Support 2012 - 2015 | VC/ Levy | 1/10/12 | 31/5/15 | $91,500 | $356 | Horticulture Australia Limited | Peter Whittle 0409 578 937 |
| MT12029 | 2 |  | Horticultural Market Access Manager 2012 - 2015 | VC/ Levy | 1/10/12 | 30/9/15 | $613,500 | $1,687 | Lawrence Consulting | Sam Lawrence |
| MT12049 | 3 |  | A model for industry planning and preparedness for an incursion of Varroa mite | VC/ Levy | 17/6/13 | 30/5/15 | $58,400 | $5,571 | Plant Health Australia | Brad Siebert 0417 653 128 |
| MT13059 | 3 |  | Developing and optimising production of a male-only, temperature-sensitive-lethal, strain of Q-fly, B. tryoni for SIT | Levy | 13/6/14 | 19/1/19 | $2,195,766 | $141,384 | South Australian Research and Development Institute | Dr Peter Crisp 08 8303 9539 |
| VG07081 | 2 |  | Developing 'superyellow' enhanced pigment sweetcorn for eye-health | VC | 1/5/08 | 31/3/15 | $685,509 | $0 | The Department of Agriculture, Fisheries and Forestry, Queensland | Dr Tim O'Hare 07 5466 2222 |
| VG07198 | 3 |  | Pre-emptive breeding to combine superior eating quality in tropical super sweet corn with resistance to major diseases | VC | 1/5/08 | 31/5/14 | $452,093 | $90,419 | The Department of Agriculture, Fisheries and Forestry, Queensland | Dr Solomon Fekybelu 07 4660 3661 |
| VG08012 | 4 |  | Nuffield Farming Scholarship | Levy | 3/10/08 | 30/9/13 | $136,980 | $9,660 | Nuffield Australia Farming Scholars | Nicola Raymond 0406 761 798 |
| VG08045 | 4 |  | National greenhouse industry business and productivity analysis system | Levy | 1/1/09 | 30/11/14 | $477,388 | $10,726 | NSW Department of Primary Industries | Joshua Jarvis 02 4348 1969 |
| VG09009 | 1 |  | Evaluating sweetpotato varieties to meet market needs | Levy | 1/1/10 | 31/1/14 | $375,893 | $67,180 | Australian Sweetpotato Growers Inc | Rodney Wolfenden 0403 251 151 |
| VG09041 | 3 |  | Environmental effects of vegetable production on sensitive waterways | Levy | 21/3/10 | 21/3/14 | $563,515 | $112,703 | The Department of Agriculture, Fisheries and Forestry, Queensland | Dr Stephen Harper 07 5466 2222 |
| VG09052 | 3 |  | Integration of crop and soil insect management in sweetpotatoes | Levy | 1/2/10 | 1/5/14 | $585,743 | $96,148 | Australian Sweetpotato Growers Inc | Dean Akers 0412 133 555 |
| VG09124 | 3 |  | Increasing energy efficiency and assessing an alternate energy option for Australian Protected Cropping | VC/ Levy | 15/1/10 | 30/5/14 | $480,371 | $117,000 | NSW Department of Primary Industries | Joshua Jarvis 02 4348 1969 |
| VG10047 | 4 |  | Economic survey of Australian vegetable growers, 2010/11, 2011/12 and 2012/13 | Levy | 1/3/11 | 30/9/13 | $909,045 | $181,081 | Australian Bureau of Agricultural and Resource Economics and Sciences | Milly Lubulwa 02 6272 2069 |

| Project no. | Industry obj | Rural R&D priorities | Project title | Levy or VC | Project start | Project finish | Life of project value | 2013/14 expenditure | Organisation | Contact |
|---|---|---|---|---|---|---|---|---|---|---|
| VG10081 | 3 |  | Breeding capsicum for Tospovirus resistance | VC | 5/8/10 | 1/12/14 | $545,144 | $27,257 | The Department of Agriculture, Fisheries and Forestry, Queensland | Des McGrath 07 5466 2299 |
| VG10082 | 3 |  | Continuing on-farm improvements through good practice demonstration | VC | 20/12/10 | 30/11/13 | $81,133 | $16,626 | Vegetables WA | John Shannon 08 9481 0834 |
| VG10094 | 1 |  | Consumer attitudes and usage in the green leaf category | VC | 15/11/10 | 31/8/13 | $398,969 | $79,793 | Harvest FreshCuts Pty Ltd | Treena Welch 07 3712 3800 |
| VG10104 | 3 |  | Management of virus diseases in vegetables | VC | 18/10/11 | 28/2/14 | $360,879 | $129,065 | The Department of Agriculture, Fisheries and Forestry, Queensland | Denis Persley 07 3255 4388 |
| VG10105 | 1 |  | Transforming tenderness and eating quality in tropical sweetcorn through introgression of tender germplasm | VC | 1/1/11 | 30/12/14 | $154,482 | $0 | The Department of Agriculture, Fisheries and Forestry, Queensland | Aldo Zeppa 07 4660 3635 |
| VG10126 | 2 |  | Low dose methyl bromide treatment of capsicum to control fruit fly | VC | 14/10/11 | 28/2/14 | $108,329 | $0 | The Department of Agriculture, Fisheries and Forestry, Queensland | Pauline Wyatt 07 4057 3679 |
| VG11000 | 3 |  | Targeting insects using novel inhibitors of development and physiology | Levy | 26/9/11 | 10/7/13 | $196,000 | $39,200 | The University of Queensland | Dr Sassan Asgari 07 3365 2043 |
| VG11001 | 4 |  | Nuffield Farming Scholarship | Levy | 1/9/11 | 30/9/16 | $150,000 | $57,000 | Nuffield Australia Farming Scholars | James Geltch 0412 696 076 |
| VG11013 | 3 |  | Strengthening biosecurity for the Australian vegetable industry | Levy | 1/9/11 | 28/2/15 | $212,218 | $56,206 | AUSVEG Ltd | Richard Mulcahy 03 9882 0277 |
| VG11025 | 3 |  | Generation of residue, efficacy and crop safety data for pesticide minor-use permit applications - Agrisearch | VC/ Levy | 7/12/11 | 2/8/13 | $319,160 | $9,790 | Eurofins Agrisearch | Martin Collett 02 6362 4539 |
| VG11028 | 3 |  | Generation of residue, efficacy and crop safety data for pesticide minor-use permit applications - CPR | VC/ Levy | 7/12/11 | 31/8/13 | $122,829 | $5,196 | Crop Protection Research Pty Ltd | Rebecca Lean 0400 652 377 |
| VG11033 | 3 |  | Vegetable minor use allocation | Levy | 29/2/12 | 31/5/15 | $76,650 | $14,800 | Horticulture Australia Limited | Jodie Pedrana 0404 314 751 |
| VG11039 | 3 |  | Movento label additions – Lettuce (western flower thrips), rhubarb, bulb vegetable crop group and herbs. | Levy | 28/6/12 | 8/11/13 | $149,000 | $30,000 | Bayer CropScience Pty Ltd | Robert Vitelli 0419 495 101 |
| VG11706 | 4 |  | Vegetable Growers Study Tour – Germany, Netherlands | VC/ Levy | 13/9/11 | 30/5/14 | $330,616 | $43,811 | AUSVEG Ltd | Richard Mulcahy 03 9882 0277 |
| VG11707 | 4 |  | International Networking for the Australian Vegetable Industry | Levy | 28/11/11 | 30/5/14 | $114,825 | $41,546 | AUSVEG Ltd | Richard Mulcahy 03 9882 0277 |
| VG11711 | 4 |  | Vegetable Young Growers Tour 2012 - 2014 | VC/ Levy | 25/6/12 | 15/12/14 | $226,312 | $4,893 | AUSVEG Ltd | Richard Mulcahy 03 9882 0277 |
| VG12006 | 4 |  | Production of Australian Vegetable Industry Vegenotes series | Levy | 1/9/12 | 31/8/15 | $200,524 | $60,000 | AUSVEG Ltd | Richard Mulcahy 03 9882 0277 |
| VG12008 | 1 |  | EnviroVeg Program for promoting environmental best practice in the Australian vegetable industry | Levy | 25/9/12 | 28/9/15 | $918,786 | $204,108 | AUSVEG Ltd | Richard Mulcahy 03 9882 0277 |

| Project no. | Industry obj | Rural R&D priorities | Project title | Levy or VC | Project start | Project finish | Life of project value | 2013/14 expenditure | Organisation | Contact |
|---|---|---|---|---|---|---|---|---|---|---|
| VG12014 | 4 |  | National Vegetable Industry Communication Strategy (VICS): management and implementation | Levy | 1/12/12 | 30/11/15 | $1,194,574 | $294,299 | AUSVEG Ltd | Richard Mulcahy 03 9882 0277 |
| VG12017 | 3 |  | Controlling multiple heading and transplant shock in lettuce | VC | 21/6/13 | 31/1/16 | $298,600 | $94,725 | Applied Horticultural Research Pty Ltd | Dr Gordon Rogers 0418 517 777 |
| VG12022 | 3 |  | Managing biting fly in vegetable crop residues | VC | 1/10/12 | 15/7/15 | $388,029 | $80,346 | Department of Agriculture and Food Western Australia | Dr Ian McPharlin 08 9368 3671 |
| VG12024 | 4 |  | Vietnamese Field Extension Officer for the Western Australian vegetable industry | VC | 15/8/12 | 30/6/15 | $149,353 | $39,827 | Vegetables WA | John Shannon 08 9481 0834 |
| VG12026 | 4 |  | Field Extension Officer for Western Australia | VC | 16/9/12 | 15/9/15 | $488,937 | $232,796 | Vegetables WA | John Shannon 08 9481 0834 |
| VG12033 | 4 |  | Vegetables Australia | Levy | 1/9/12 | 30/8/15 | $927,413 | $259,675 | AUSVEG Ltd | Richard Mulcahy 03 9882 0277 |
| VG12034 | 2 |  | Pilot scale development and assessment of microwave postharvest disinfestation of insects of economic significance | Levy | 1/10/12 | 28/2/15 | $425,000 | $67,500 | CSIRO Climate Adaption Flagship | Dr Mala Gamage 03 9731 3471 |
| VG12035 | 3 |  | Minor use permit management for the vegetable industry | Levy | 10/8/12 | 1/7/13 | $100,000 | $0 | Growcom Australia | Janine Clark 0407 113 713 |
| VG12036 | 4 |  | Implementation Officer and design team coordination for the Vegetable R&D Program (AUSVEG) | Levy | 1/8/12 | 1/8/13 | $79,102 | -$8,897 | AUSVEG Ltd | Richard Mulcahy 03 9882 0277 |
| VG12038 | 4 |  | Vegetable R&D program implementation and design team support (HAL) | Levy | 1/9/12 | 31/7/13 | $108,721 | $15,361 | Horticulture Australia Limited | Will Gordon 0427 920 924 |
| VG12039 | 4 |  | Vegetable Industry Technical Advisory Group (TAG) Chair | Levy | 1/8/12 | 1/8/15 | $84,000 | $48,000 | AUSVEG Ltd | Richard Mulcahy 03 9882 0277 |
| VG12043 | 1 |  | Conveying health benefits of Australian vegetables | Levy | 20/2/13 | 31/7/14 | $334,000 | $87,200 | Plant & Food Research Australia Pty Ltd | Dr Jocelyn Eason +64 6 355 6116 |
| VG12050 | 4 |  | Future Technologies Seminar | Levy | 1/2/13 | 31/8/13 | $132,567 | -$51,500 | AUSVEG Ltd | Richard Mulcahy 03 9882 0277 |
| VG12051 | 3 |  | Generation of residue and crop safety data for pesticide in protected vegetable crops 2012 | Levy | 5/12/12 | 13/12/13 | $133,100 | $66,550 | AgriSolutions Australia Pty Ltd | Andrew Keats 07 3204 1115 |
| VG12052 | 3 |  | Generation of efficacy, crop safety and residue data for the control of anthracnose in lettuce | Levy | 4/2/13 | 31/1/15 | $175,301 | $21,740 | Peracto Pty Ltd | Phillip Frost 03 6423 2044 |
| VG12053 | 4 |  | Growing Leaders 2013 - 2015 inclusive | Levy | 20/2/13 | 1/12/15 | $385,225 | $89,885 | Rural Training Initiatives | Jill Briggs 02 6035 7284 |
| VG12067 | 1 |  | Vital Vegetables Australian Commercialiser | VC | 7/12/12 | 30/8/13 | $32,791 | $2,791 | Department of Environment and Primary Industries, Victoria | Andrew Grace 03 9217 4148 |
| VG12071 | 4 |  | Coordinated knowledge and Industry Development Program | Levy | 18/3/13 | 17/3/16 | $1,987,091 | $581,224 | AUSVEG Ltd | Richard Mulcahy 03 9882 0277 |

| Project no. | Industry obj | Rural R&D priorities | Project title | Levy or VC | Project start | Project finish | Life of project value | 2013/14 expenditure | Organisation | Contact |
|---|---|---|---|---|---|---|---|---|---|---|
| VG12072 | 3 | | Desktop preparation of pesticide minor-use permit applications in vegetable crops 2012 | Levy | 18/1/13 | 31/8/13 | $25,625 | $4,085 | Growcom Australia | Janine Clark 0407 113 713 |
| VG12073 | 3 | | Generation of residue and crop safety data for pesticide minor-use permit applications in vegetable crops 2012 - Peracto | Levy | 18/1/13 | 30/5/14 | $78,835 | $39,646 | Peracto Pty Ltd | Phillip Frost 03 6423 2044 |
| VG12074 | 3 | | Generation of residue and crop safety data for pesticide minor-use permit applications in vegetable crops 2012 - CPR | VC/ Levy | 14/1/13 | 30/11/14 | $215,849 | $80,339 | Crop Protection Research Pty Ltd | Dale Griffin 03 9775 4230 |
| VG12075 | 3 | | Generation of residue and crop safety data for pesticide minor-use permit applications in vegetables 2012 - Agrisearch | Levy | 14/1/13 | 30/9/14 | $242,505 | $90,505 | Eurofins Agrisearch | Les Mitchell 03 5821 2021 |
| VG12076 | 3 | | Generation of residue and crop safety data for pesticide minor-use permit applications in vegetables 2012 - Agrisol | Levy | 14/1/13 | 30/5/14 | $62,931 | $25,172 | AgriSolutions Australia Pty Ltd | Andrew Keats 07 3204 1115 |
| VG12078 | 1 | | Consumer and market program for the vegetable industry | Levy | 22/4/13 | 21/4/16 | $845,000 | $201,666 | Colmar Brunton | Jenny Witham 03 8640 5216 |
| VG12080 | 4 | | Leadership program expenses 2013 - 2016 | Levy | 1/3/13 | 30/6/16 | $75,000 | $3,609 | Horticulture Australia Limited | Sharyn Casey 02 8295 2379 |
| VG12081 | 3 | | Review of vegetable SARP reports | Levy | 1/3/13 | 5/11/13 | $15,052 | $11,052 | Horticulture Australia Limited | Jodie Pedrana 0404 314 751 |
| VG12083 | 2 | | Understanding the nature, origins, volume and values of vegetable imports | Levy | 30/5/13 | 30/3/18 | $196,891 | $74,107 | RM Consulting Group | Luke Rolley 03 5261 6105 |
| VG12084 | 2 | | Enhancing market attitudes towards IPM and sustainable vegetable production practices | Levy | 26/4/13 | 5/5/14 | $98,000.00 | $46,400 | Applied Horticultural Research Pty Ltd | Dr Gordon Rogers 02 8627 1040 |
| VG12085 | 3 | | Biosecurity: Benchmarking study to assess vegetable industry awareness and preparedness | Levy | 22/4/13 | 29/11/13 | $97,560 | $39,024 | Macquarie Franklin | Dr Lee Peterson 03 6244 0100 |
| VG12086 | 3 | | Investigating the costs associated with the production, sale and distribution of vegetables | Levy | 27/5/13 | 28/2/14 | $188,945 | $132,261 | RM Consulting Group | Adrian Kennelly 0427 679 041 |
| VG12087 | 4 | | Updating and republishing valuable vegetable industry resources | Levy | 13/5/13 | 14/11/14 | $286,500 | $201,850 | Applied Horticultural Research Pty Ltd | Dr Gordon Rogers 0418 517 777 |
| VG12089 | 4 | | Vegetable program development and tendering costs | Levy | 18/2/13 | 30/5/15 | $50,000 | $3,979 | Horticulture Australia Limited | Will Gordon 0427 920 924 |
| VG12090 | 1 | | Conveying the positive social, economic, environmental and other benefits of Australian vegetables | Levy | 20/5/13 | 31/5/15 | $196,000 | $45,600 | Review Partners | Paul Costantoura 02 9191 9201 |
| VG12091 | 1 | | Development and implementation of a vegetable industry crisis management plan | Levy | 14/6/13 | 30/4/14 | $298,600 | $175,453 | Control Risks Group Pty Ltd | Matthew Oyston 02 9279 0099 |

| Project no. | Industry obj | Rural R&D priorities | Project title | Levy or VC | Project start | Project finish | Life of project value | 2013/14 expenditure | Organisation | Contact |
|---|---|---|---|---|---|---|---|---|---|---|
| VG12092 | 4 | | Evaluating the success of VG12045/069/070: Barriers and drivers of vegetable consumption and purchase | Levy | 1/5/13 | 30/4/14 | $19,600 | $3,920 | Review Partners | Paul Costantoura 02 9191 9201 |
| VG12093 | 4 | | Exporting to China: A symposium for vegetable growers | Levy | 1/4/13 | 30/8/13 | $146,000 | -$31,702 | AUSVEG Ltd | Richard Mulcahy 03 9882 0277 |
| VG12094 | 1 | | Optimum vegetable portion size to meet consumer needs | Levy | 30/4/13 | 31/5/14 | $150,000 | $55,000 | BDRC Jones Donald Pty Limited | Georgina Woodley 02 9267 6444 |
| VG12095 | 1 | | Identifying market opportunities for Australian vegetables in China | Levy | 22/4/13 | 30/4/14 | $246,500 | $218,000 | Cognition Research | Bill Morgan 02 9315 7131 |
| VG12096 | 1 | | New vegetable products for personal nutrition | Levy | 21/6/13 | 31/10/16 | $127,500 | $21,250 | CSIRO Division of Animal, Food and Health Sciences | Dr Louise Bennett 03 9731 3318 |
| VG12100 | 2 | | Asia Fruit Logistica | Levy | 15/4/13 | 14/4/14 | $198,715 | $39,743 | AUSVEG Ltd | Richard Mulcahy 03 9882 0277 |
| VG12101 | 2 | | Reverse Trade Mission | Levy | 26/4/13 | 14/4/14 | $160,430 | -$7,756 | AUSVEG Ltd | Richard Mulcahy 03 9882 0277 |
| VG12102 | 3 | | Summer Root Rot in parsley scoping study | Levy | 8/5/13 | 1/7/13 | $5,000 | $2,500 | Stuart Grigg Ag-Hort Consulting Pty Ltd | Stuart Grigg 0400 860 763 |
| VG12103 | 3 | | Increasing productivity and extending seasonality in soil grown vegetables using capsicum as a candidate | VC | 11/6/13 | 31/5/16 | $341,052 | $213,157 | The Department of Agriculture, Fisheries and Forestry, Queensland | David Carey 07 3255 4481 |
| VG12104 | 3 | | An intelligent farm robot for the vegetable industry | Levy | 14/6/13 | 31/5/15 | $941,936 | $255,564 | The University of Sydney | Prof Salah Sukkarieh 02 9351 2222 |
| VG12105 | 3 | | Review of pesticide investment in the vegetable industry | Levy | 5/6/13 | 31/8/13 | $50,000 | $10,000 | Scholefield Robinson Horticultural Services Pty Ltd | Dr Prue McMichael 0407 606 461 |
| VG12108 | 3 | | Improving the management of insect contaminants in processed leafy vegetables | VC | 19/6/13 | 30/11/15 | $480,000 | $153,600 | Applied Horticultural Research Pty Ltd | Dr Gordon Rogers 0418 517 777 |
| VG12109 | 3 | | Management of insecticide resistance in the green peach aphid | Levy | 25/6/13 | 31/5/16 | $405,124 | $178,254 | Cesar Pty Ltd | Dr Paul Umina 0405 464 259 |
| VG12112 | 3 | | Improving grower access to new chemistry to control downy mildew disease | VC/ Levy | 17/6/13 | 30/8/15 | $276,000 | $89,899 | Syngenta Australia Pty Ltd | Lauren O'Connor 0408 499 980 |
| VG12113 | 4 | | Enhancing best practice in vegetable production and business management in the Northern Territory | VC/ Levy | 15/7/13 | 31/7/16 | $360,000 | $145,000 | Northern Territory Farmers Association Inc | Greg Owens 0434 746 575 |
| VG12114 | 3 | | Minor use permit management for the vegetable industry | Levy | 20/6/13 | 2/7/15 | $219,350 | $63,130 | Growcom Australia | Janine Clark 0407 113 713 |
| VG12115 | 3 | | Integrating sustainable soil health practices into a commercial vegetable farming operation | VC | 24/6/13 | 31/5/16 | $194,500 | $55,550 | Applied Horticultural Research Pty Ltd | Dr Gordon Rogers 02 8627 1040 |
| VG12700 | 4 | | USA Growers Tour 2013/14 | VC/ Levy | 30/9/12 | 20/12/15 | $345,672 | $114,876 | AUSVEG Ltd | Richard Mulcahy 03 9882 0277 |

| Project no. | Industry obj | Rural R&D priorities | Project title | Levy or VC | Project start | Project finish | Life of project value | 2013/14 expenditure | Organisation | Contact |
|---|---|---|---|---|---|---|---|---|---|---|
| VG12706 | 4 | | Women's Grower Study Tour 2013 | VC/ Levy | 15/5/13 | 30/12/13 | $93,060 | -$15,810 | AUSVEG Ltd | Richard Mulcahy 03 9882 0277 |
| VG12707 | 4 | | Carrot Grower Study Tour 2013 | VC/ Levy | 15/5/13 | 30/11/13 | $56,510 | -$1,748 | AUSVEG Ltd | Richard Mulcahy 03 9882 0277 |
| VG13004 | 3 | | Innovating new virus diagnostics and planting bed management in the Australian Sweetpotato Industry | Levy | 28/2/14 | 31/3/18 | $1,034,720 | $80,638 | Australian Sweetpotato Growers Inc | Rodney Wolfenden 0403 251 151 |
| VG13010 | 3 | | Enhancing decision making capacity for sweetpotato cropping systems | Levy | 1/4/14 | 30/9/17 | $504,000 | $0 | Australian Sweetpotato Growers Inc | Dean Akers 0412 133 555 |
| VG13018 | 4 | | Implementation officer and design team coordination for the vegetable R&D program - stage 2 (AUSVEG) | Levy | 1/8/13 | 1/8/16 | $330,000 | $105,600 | AUSVEG Ltd | Richard Mulcahy 03 9882 0277 |
| VG13019 | 4 | | Vegetable R&D program implementation and design team support (HAL) - Phase 2 | Levy | 1/11/13 | 31/7/16 | $331,517 | $131,563 | Horticulture Australia Limited | Will Gordon 0427 920 924 |
| VG13020 | 1 | | Fostering and enhancing food safety in the vegetable industry | Levy | 2/7/13 | 1/12/13 | $48,640 | $48,640 | RMCG | Dr Doris Blaesing 0438 546 487 |
| VG13025 | 4 | | Plant health plan implementation for the vegetable industry | Levy | 27/9/13 | 27/9/14 | $50,000 | $19,285 | RMCG | Dr Doris Blaesing 0438 546 487 |
| VG13026 | 3 | | Generation of residue data for pesticide minor-use permit applications in vegetable crops 2013 - Agrisearch | Levy | 2/10/13 | 31/3/15 | $120,744 | $33,795 | Eurofins Agrisearch | Les Mitchell 03 5821 2021 |
| VG13027 | 3 | | Generation of residue data for pesticide minor-use permit applications in vegetable crops 2013 - Agrisolutions | Levy | 2/10/13 | 31/3/15 | $103,129 | $61,877 | AgriSolutions Australia Pty Ltd | Andrew Keats 07 3204 1115 |
| VG13028 | 3 | | Generation of residue data for pesticide minor-use permit applications in vegetable crops 2013 - CPR | Levy | 2/10/13 | 31/3/15 | $240,047 | $126,428 | Crop Protection Research Pty Ltd | Dale Griffin 03 9775 4230 |
| VG13029 | 3 | | Adaptive pest management for horticulture under climate change – pilot pest scoping | Levy | 14/10/13 | 31/7/14 | $50,000 | $40,000 | CSIRO Climate Adaption Flagship | Darren Kriticos 02 6246 0417 |
| VG13033 | 1 | | 2014 Produce Innovations Seminar: USA showcase | Levy | 1/12/13 | 31/8/14 | $282,035 | $225,628 | AUSVEG Ltd | Richard Mulcahy 03 9882 0277 |
| VG13034 | 4 | | Japan Export Symposium | Levy | 1/12/13 | 30/9/14 | $174,200 | $139,360 | AUSVEG Ltd | Richard Mulcahy 03 9882 0277 |
| VG13035 | 2 | | 2014 Reverse Trade Mission | Levy | 1/12/13 | 31/10/14 | $415,465 | $373,919 | AUSVEG Ltd | Richard Mulcahy 03 9882 0277 |
| VG13036 | 4 | | Graduate Alumni Industry Network (GAIN) | Levy | 15/11/13 | 27/5/16 | $118,800 | $26,040 | Rural Training Initiatives | Jill Briggs 02 6035 7284 |
| VG13039 | 3 | | Remediation of soil contaminated by Salmonella enterica to expedite plant or replant of vegetables | VC/ Levy | 9/4/14 | 25/3/16 | $150,728 | $65,000 | The University of Sydney | Dr Robyn McConchie 0401 718 413 |
| VG13040 | 3 | | Fruit fly research: gap analysis | Levy | 20/1/14 | 3/10/14 | $75,830 | $60,664 | Applied Horticultural Research Pty Ltd | Dr Jenny Ekman 02 8627 1040 |

| Project no. | Industry obj | Rural R&D priorities | Project title | Levy or VC | Project start | Project finish | Life of project value | 2013/14 expenditure | Organisation | Contact |
|---|---|---|---|---|---|---|---|---|---|---|
| VG13041 | 3 | | New in-field treatment solutions to control Fruit Fly (1) | Levy | 19/2/14 | 1/2/17 | $339,685 | $71,748 | The Department of Agriculture, Fisheries and Forestry, Queensland | Dr Lara Senior 0427 600 744 |
| VG13042 | 3 | | New in-field treatment solutions to control Fruit Fly (2) | Levy | 19/2/14 | 31/10/16 | $479,390 | $221,758 | Applied Horticultural Research Pty Ltd | Dr Jenny Ekman 02 8627 1040 |
| VG13043 | 2 | | New end-point treatment solutions to control Fruit Fly (1) | Levy | 1/1/14 | 2/1/17 | $498,315 | $133,417 | NSW Department of Primary Industries | Andrew Jessup 02 4348 1965 |
| VG13044 | 2 | | New end-point treatment solutions to control Fruit Fly (2) | VC/ Levy | 26/6/14 | 31/5/16 | $241,000 | $0 | The Department of Agriculture, Fisheries and Forestry, Queensland | Pauline Wyatt 07 3255 4425 |
| VG13045 | 3 | | Identification of potential alternatives to metham sodium | Levy | 12/12/13 | 5/5/14 | $29,922.00 | $29,922 | RMCG | Dr Doris Blaesing 0438 546 487 |
| VG13046 | 1 | | Malaysia and UAE market analysis and strategy: baby leaf and beans | Levy | 1/11/13 | 28/3/14 | $126,060.00 | $135,224.62 | Euromonitor International Ltd | Graham Gilbert 02 9581 9228 |
| VG13047 | 1 | | Malaysia and UAE market analysis and strategy: carrots and sweet corn | Levy | 1/11/13 | 30/5/14 | $257,700 | $206,160.00 | AgEconPlus Pty Ltd | Michael Clarke 0438 844 024 |
| VG13048 | 1 | | Market analysis and strategy: broccoli to Japan | Levy | 1/1/14 | 30/1/15 | $157,617 | $126,094 | Trade and Investment Queensland | Bronwyn Warfield 0418 783 404 |
| VG13049 | 2 | | Biogas generation feasibility study | Levy | 6/1/14 | 30/5/14 | $185,543 | $185,543 | RMCG | Dr Anne-Maree Boland 03 9882 2670 |
| VG13050 | 2 | | Production of fish food for aquaculture from vegetable waste feasibility study | Levy | 29/11/13 | 30/5/14 | $61,835 | $61,835 | Applied Horticultural Research Pty Ltd | Dr Jenny Ekman 02 8627 1040 |
| VG13051 | 3 | | On-farm power generation - options for vegetable growers | Levy | 28/11/13 | 31/10/14 | $216,735 | $140,825 | Applied Horticultural Research Pty Ltd | Dr Gordon Rogers 0418 517 777 |
| VG13052 | 3 | | Confirmation of ultra filtration as a viable low cost water disinfection and nutrient solution recycling option | Levy | 30/4/14 | 30/6/16 | $291,100 | $40,000 | Primary Principles | Jeremy Badgery-Parker 0412 819 465 |
| VG13053 | 4 | | Develop vegetable industry occupational health and safety resources | Levy | 6/2/2014 | 30/9/2015 | $288,173 | $150,000 | RMCG | Luke Rolley 0407 505 362 |
| VG13054 | 3 | | Economic evaluation of farm energy audits and benchmarking of energy use on vegetable farms | Levy | 29/11/13 | 15/12/14 | $238,075 | $120,000 | Infotech Research | John Cumming 03 9867 7446 |
| VG13055 | 3 | | Building codes and greenhouse construction | Levy | 10/12/13 | 30/9/14 | $107,788 | $86,230 | Osborn Lane Consulting Engineering | Marcel Olivotto 0437 084 240 |
| VG13057 | 1 | | Environmental assessment of the vegetable industry | Levy | 28/3/14 | 28/11/14 | $120,872 | $48,349 | RMCG | Dr Anne-Maree Boland 03 9882 2670 |
| VG13059 | 4 | | Vegetable Industry Academy of Excellence | Levy | 20/1/14 | 30/9/14 | $52,433 | $34,955 | Stride Consulting | Dr Denis White 03 9889 1127 |
| VG13062 | 3 | | Improving the efficiency of the carrot export industry: A whole of chain approach | Levy | 5/5/14 | 28/2/17 | $795,415 | $0 | Department of Agriculture and Food Western Australia | Allan McKay 0427 988 629 |
| VG13063 | 4 | | Guest worker scheme desktop study | Levy | 10/2/14 | 30/5/14 | $13,618 | $3,800 | Richard O'Brien | Richard O'Brien 02 6241 7828 |
| VG13064 | 4 | | Enhanced influencing and negotiation training program | Levy | 2/12/13 | 31/12/14 | $92,000 | $64,560 | ENS International Pty Ltd | Annie Le 02 9249 3315 |
| VG13067 | 4 | | Export readiness program | Levy | 28/11/13 | 31/1/15 | $84,600 | $84,600 | AUSVEG Ltd | Richard Mulcahy 03 9882 0277 |

| Project no. | Industry obj | Rural R&D priorities | Project title | Levy or VC | Project start | Project finish | Life of project value | 2013/14 expenditure | Organisation | Contact |
|---|---|---|---|---|---|---|---|---|---|---|
| VG13068 | 4 |  | Financial performance of Australian vegetable farms 2013/14 to 2015/16 | Levy | 2/12/13 | 31/12/16 | $990,761 | $300,360 | Australian Bureau of Agricultural and Resource Economics and Sciences | Haydn Valle 02 6272 2065 |
| VG13069 | 2 |  | Developing vegetable export opportunities in Asia and the Middle East - 2014 | Levy | 27/1/14 | 9/1/15 | $684,985 | $505,939 | AUSVEG Ltd | Richard Mulcahy 03 9882 0277 |
| VG13071 | 4 |  | ABS Survey of additional vegetable commodities 2013/14 | Levy | 20/1/14 | 30/9/15 | $175,386 | $87,727 | Australian Bureau of Statistics | Iris Hall 03 6222 5861 |
| VG13072 | 4 |  | Export opportunities for carrots, sweet corn, beans, broccoli and baby leaf: Symposia | Levy | 3/2/14 | 30/4/15 | $282,380 | $225,904 | AUSVEG Ltd | Richard Mulcahy 03 9882 0277 |
| VG13073 | 1 |  | A revolutionary new sensor for in-field measurements of food safety in leafy vegetables | Levy | 26/5/14 | 26/2/15 | $243,129 | $0 | The University of Sydney | Prof Salah Sukkarieh 02 9351 2222 |
| VG13075 | 3 |  | An investigation of low-cost protective cropping | Levy | 15/5/14 | 15/12/15 | $449,800 | $134,940.00 | Applied Horticultural Research Pty Ltd | Dr Gordon Rogers 0418 517 777 |
| VG13076 | 3 |  | Soil condition management: Extension and capacity building | Levy | 8/5/14 | 31/5/17 | $995,540 | $348,440.00 | Applied Horticultural Research Pty Ltd | Dr Gordon Rogers 0418 517 777 |
| VG13077 | 3 |  | Soil-borne disease management diagnostics | Levy | 10/6/14 | 31/7/14 | $67,302 | $0 | Tasmanian Institute of Agriculture, University of Tasmania | Dr Calum Wilson 0409 356 438 |
| VG13078 | 3 |  | Extension of integrated crop protection information | Levy | 8/5/14 | 31/5/17 | $1,002,255 | $350,789 | RMCG | Dr Anne-Maree Boland 03 9882 2670 |
| VG13079 | 3 |  | Weed management for the vegetable industry: Scoping study | Levy | 11/4/14 | 4/8/14 | $152,706 | $76,353 | University of New England | Dr Paul Kristiansen 0421 950 026 |
| VG13080 | 2 |  | Global scan for vegetable innovation: Fresh and minimally processed | Levy | 14/3/14 | 1/7/15 | $91,708 | $73,390 | Euromonitor International Ltd | Ben Dunsheath 02 9581 9200 |
| VG13081 | 3 |  | Prioritisation of vegetable crop commodities and activities for mechanisation | Levy | 1/6/14 | 30/4/15 | $66,721 | $46,705 | Tasmanian Institute of Agriculture, University of Tasmania | John McPhee 03 6430 4910 |
| VG13082 | 1 |  | Evaluation of quality assurance software for the vegetable industry | Levy | 3/4/14 | 30/3/15 | $60,409 | $36,245 | TQA Australia Inc | Belinda Hazell 0419 102 476 |
| VG13083 | 1 |  | Identifying and sharing postharvest best practice on-farm and online | Levy | 28/3/14 | 7/7/17 | $295,390 | $68,100 | Applied Horticultural Research Pty Ltd | Dr Jenny Ekman 02 8627 1040 |
| VG13084 | 2 |  | Investigating the physical supply chain to improve transport efficiency | Levy | 17/3/14 | 9/11/14 | $84,800 | $67,840 | Supply Chain STO | Tom Rafferty 0409 781 264 |
| VG13085 | 2 |  | Benchmarking australian vegetable industry points of difference | Levy | 17/3/14 | 21/7/14 | $99,211 | $79,583 | Euromonitor International Ltd | Ben Dunsheath 02 9581 9200 |
| VG13086 | 1 |  | Identify process improvements for preserving peak freshness of broccoli | Levy | 29/4/14 | 30/9/14 | $69,710 | $55,768 | Applied Horticultural Research Pty Ltd | Dr Jenny Ekman 02 8627 1040 |
| VG13087 | 1 |  | Review optimal cooking techniques for vegetables to maximise retention of nutrients | Levy | 1/4/14 | 30/11/14 | $79,332 | $43,560 | MacTavish West | Dr Hazel MacTavish-West 0459 764 859 |
| VG13088 | 1 |  | Baseline demographic research for the vegetable industry | Levy | 23/6/14 | 31/8/15 | $862,500 | $258,750 | The Nielsen Company | Stephanie Lim Inone 0410 420 64 |

| Project no. | Industry obj | Rural R&D priorities | Project title | Levy or VC | Project start | Project finish | Life of project value | 2013/14 expenditure | Organisation | Contact |
|---|---|---|---|---|---|---|---|---|---|---|
| VG13089 | 1 | | Development of a vegetable education kit | Levy | 23/5/14 | 14/10/15 | $300,000 | $40,000 | CSIRO Preventative Health Flagship | Astrid Poelman 02 9490 8356 |
| VG13090 | 1 | | A strategy to address consumption of vegetables in children | Levy | 4/6/14 | 19/12/14 | $123,000 | $18,400 | CSIRO Preventative Health Flagship | Dr David Cox 08 8303 8811 |
| VG13092 | 3 | | Improved skill for regional climate in the ACCESS-based POAMA-3 model | Levy | 16/6/14 | 28/2/17 | $150,000 | $0 | Bureau of Meteorology | Debbie Hudson 03 9669 4796 |
| VG13096 | 3 | | Minor use and agronomy coordinator: Minor use priorities and awareness program | Levy | 2/5/14 | 15/5/17 | $771,777 | $154,355 | AUSVEG Ltd | Richard Mulcahy 03 9882 0277 |
| VG13097 | 2 | | Vegetable industry market access and development program | Levy | 23/6/14 | 31/3/17 | $3,275,120 | $982,536 | AUSVEG Ltd | Richard Mulcahy 03 9882 0277 |
| VG13101 | 3 | | Effective management of parsley summer root rot | Levy | 23/6/14 | 31/7/17 | $468,338 | $15,000 | NSW Department of Primary Industries | Len Tesoriero 02 4640 6406 |
| VG13105 | 1 | | Benchmarking and comparing the production and regulatory conditions of Australian vegetable producers with our competitors | Levy | 25/6/14 | 25/12/15 | $214,090 | $42,818 | Control Risks Group Pty Ltd | Rupert Evill +65 6227 2038 |
| VG13106 | 3 | | Evaluation of commercially available farm management software programs for the vegetable industry | Levy | 25/6/14 | 31/5/15 | $30,136 | $0 | TQA Australia Inc | Belinda Hazell 0419 102 476 |
| VG13107 | 3 | | Benchmarking international road transport regulations | Levy | 25/6/14 | 31/1/15 | $110,000 | $0 | HGH Consultants | Andrew Higginson 0418 628 465 |
| VG13109 | 3 | | Innovative ways to address waste management on vegetable farms | Levy | 23/6/14 | 31/5/15 | $89,573 | $29,858 | RMCG | Dr Anne-Maree Boland 03 9882 2670 |
| VG13110 | 1 | | Economic modelling of the vegetable industry | Levy | 4/6/14 | 31/5/15 | $130,020 | $39,006 | Econtech Pty Ltd | Chris Murphy 02 6295 8884 |
| VG13111 | 3 | | Manipulation of regulatory microRNAs to suppress insecticide resistance in diamondback moth | Levy | 2/6/14 | 15/6/17 | $408,399 | $75,000 | The University of Queensland | Dr Sassan Asgari 07 3365 2043 |
| VG13113 | 3 | | Evaluation of automation and robotics innovations: developing next generation vegetable production systems | VC | 25/6/14 | 31/5/16 | $200,232 | $100,116 | The Department of Agriculture, Fisheries and Forestry, Queensland | Sue Heisswolf 07 4761 4028 |
| VG13114 | 4 | | Printing of Tropical Pests and Diseases Field Guide | Levy | 20/6/14 | 1/6/15 | $120,564 | $50,000 | NT Department of Resources | Bob Williams 0457 507 458 |
| VG13115 | 4 | | Field Extension Officer for Tasmania | VC | 27/6/14 | 26/6/17 | $412,021 | $0 | Tasmanian Farmers & Graziers Association | Nick Steel 0419 211 491 |
| VG13116 | 4 | | 2015 Global Innovations in Horticulture Seminar | Levy | 30/6/14 | 31/8/15 | $362,257 | $0 | AUSVEG Ltd | Richard Mulcahy 03 9882 0277 |
| VG13706 | 4 | | Women's Grower Study Tour 2014 - 2016 | VC/ Levy | 1/5/14 | 30/12/16 | $356,156 | $96,840 | AUSVEG Ltd | Richard Mulcahy 03 9882 0277 |
| VG13707 | 4 | | Vegetable Industry's Participation at the International Horticultural Congress, Brisbane, August 2014 | Levy | 1/5/14 | 30/11/14 | $98,160 | $88,344 | AUSVEG Ltd | Richard Mulcahy 03 9882 0277 |
| VG13800 | 4 | | Vegetable Industry Annual Report 2012/13 | Levy | 1/7/13 | 30/6/14 | $49,758 | $49,758 | Horticulture Australia Limited | Barbara Knezevic-Marinos 02 8295 2318 |
| VG13910 | 4 | | Vegetable Consultation Funding Agreement 2013/14 | Levy | 1/7/13 | 31/10/14 | $1,203,428 | $1,116,090 | AUSVEG Ltd | Will Gordon 0427 920 924 |

**Australian Government Rural R&D Priorities:** Productivity and adding value; Supply chain and markets; Natural resource management; Climate change and climate variability; Biosecurity; Innovation skills; Technology

# VEGETABLE PERMITS

| Permit number | Permit description | Date Issued | Expiry Date | Permit holder | States |
|---|---|---|---|---|---|
| **ALLIUMS** | | | | | |
| PER10272 | Spirotetramat (Movento) / Garlic / Onion thrips | 31-May-13 | 30-Jun-17 | Aust Garlic Producers | NSW, Tas |
| PER10824 | Mancozeb + Metalaxyl / Garlic / Downy Mildew & Purple Blotch | 27-Feb-13 | 31-Mar-23 | Aust Garlic Producers | All states (excl. Vic) |
| PER11450 | Maldison and dichlorvos / Fruit fly hosts / Fruit fly monitoring | 7-May-10 | 31-Mar-15 | Biosecurity Qld | Qld |
| PER11948 | Methyl Bromide / Fruit and vegetables / post harvest fumigation - Fruit fly, whiteflies, thrips | 1-Sep-10 | 31-Aug-15 | Dept Resources NT | NT |
| PER12008 | Methyl Bromide / Fruit & Fruiting vegetables / Fruit fly & Thrips | 19-Oct-09 | 30-Oct-14 | DPIPWE Tas | Tas |
| PER12050 | Dichlorvos & Maldison / Fruit Fly Host Species / Fruit Fly | 17-Aug-10 | 31-Mar-15 | DPIPWE Tas | Tas |
| PER12221 | Diazinon 800 / Leeks, Cauliflower / Leeks - Onion fly, Cauliflower - onion seedling maggot | 13-Aug-13 | 30-Sep-16 | Growcom | All states (excl. Vic) |
| PER12465 | Copper (Copper Oxychloride/Cuprous Oxide/Cupric Hydroxide) / Spring onions & shallots / Downy mildew | 27-Sep-09 | 30-Sep-14 | Growcom | All states (excl. Vic) |
| PER13036 | Ethofumesate (Tramat) / Beetroot & Onions / Grass weeds | 8-Jun-09 | 30-Jun-15 | Growcom | Tas |
| PER13088 | Methomyl (Lannate L) / Specified - fruiting vegetables (cucurbits), specified - fruiting vegetables (other than cucurbits), specified - Root & tuber vegetables (bulb only), ginger, parsley, rakkyo, shallot, silverbeet, tumeric & celery / Helicoverpa spp., cucumber moth, cluster caterpillar, loopers, webworm, rutherglen bug, thrips including Western flower thrips | 9-Mar-14 | 30-Sep-17 | Growcom | All states (excl. Vic) |
| PER13205 | Propachlor (Ramrod) / Lettuce, spinach, silverbeet, rocket, Brassica leafy vegetables, spring onions and shallots / Annual grasses and broadleaf weeds | 18-Jun-12 | 30-Sep-15 | Growcom | All states (excl. Vic) |
| PER13257 | Boscalid (Filan Fungicide) / Bulb vegetables (not onions) and carrots / Sclerotinia rot | 28-May-12 | 30-Jun-15 | Growcom | All states |
| PER13466 | Petroleum oil / Alliums, brassica vegetables, celery, cucurbits, eggplant, leafy vegetables, lettuce, okra, peppers, snow & sugar snap peas, tomatoes, Rocket, parsley / Specified insect pests | 29-Jun-12 | 30-Nov-17 | Growcom | All states (excl. Vic) |
| PER13626 | Chlorothalonil (Bravo 720 SC) / Fennel / Downy Mildew, Purple Blotch | 21-Sep-11 | 31-Jul-16 | Growcom | All states (excl. Vic) |
| PER13653 | Spinetoram (Success Neo) / Specific Root Vegetables, Alliums (not onions) & Celeriac / Various insect pests | 29-Mar-12 | 31-Mar-17 | Growcom | All states (excl. Vic) |
| PER13698 | Chlorfenapyr (Secure) / Spring Onions and Shallots / Western flower thrips | 28-May-12 | 30-Jun-17 | Growcom | All states (excl. Vic) |
| PER14008 | Clethodim (Select herbicide) / Spring Onions, Leeks and Shallots / Grass Weeds | 28-May-12 | 31-Mar-17 | Growcom | All states (excl. Vic) |
| PER14048 | Simazine, cyanazine, propachlor, ioxynil, ethofumesate, oxyfluorfen, pendimethalin / Leeks & garlic / Specified Grass and Broadleaf Weeds | 17-May-12 | 30-Sep-15 | Growcom | All states (excl. Vic) |
| PER14073 | Metolachlor (Dual Gold) / Silverbeet, Spring onions, Shallots, Green beans and Navy beans / Various broadleaf and grass weeds. | 23-Jul-12 | 30-Jun-17 | Growcom | All states (excl. Vic) |
| PER14080 | Maldison / Leeks, Spring onions and Shallots / Onion Thrips | 1-Oct-12 | 31-Oct-18 | Growcom | All states (excl. Vic) |
| PER14142 | Phosphorous acid / Lettuce (leaf and hydroponic), Fennel and Bulb (Allium) Vegetables / Downy Mildew | 1-Oct-12 | 30-Sep-17 | Growcom | All states (excl. Vic) |
| PER14282 | Pendimethalin / Spring Onions, Shallots & Radish / Various broadleaf and grass weeds | 1-May-13 | 31-Mar-23 | Growcom | All states (excl. Vic) |
| PER14457 | Diazinon 800 / Spring onions and shallots / Thrips (excluding WFT) and onion seedling maggot | 1-Jul-13 | 30-Jun-18 | Growcom | All states (excl. Vic) |
| PER14471 | Methomyl (Lannate L) / Spring onions and Shallots / Western Flower Thrips. | 1-Apr-13 | 30-Sep-14 | Growcom | All states (excl. Vic) |
| PER14473 | Ioxynil (Totril Selective Herbicide) / Spring onion, Shallot & Welsh onion / Broadleaf Weeds | 17-Oct-13 | 31-Mar-16 | Growcom | All states (excl. Vic) |
| PER14484 | Fluazifop-p-butyl / Various root and allium vegetable crops / Grass weeds, including couch and guinea grass (as listed on product label) | 22-Nov-13 | 31-Dec-16 | Growcom | All states (excl. Vic) |
| PER14536 | Alpha-cypermethrin / Chicory, Leeks, Spring Onions, Shallots / Red Legged Earth mite, onion thrips | 19-Mar-14 | 30-Jun-19 | Growcom | ACT,NSW, Qld, Tas, NT & WA only |
| PER14742 | Lambda-cyhalothrin (Karate Zeon) / Shallots & Spring onions / Red Legged Earth Mite , Rutherglen Bug, Grey Cluster Bug, Looper, Plague Thrips | 30-May-14 | 31-Mar-19 | Growcom | All states (excl. Vic) |
| PER14842 | Dimethomorph & Mancozeb / Leeks, Spring Onions and Shallots / Downy Mildew, Purple Blotch & Botrytis rots | 18-Dec-13 | 30-Jun-18 | Growcom | All states (excl. Vic) |
| PER8930 | Fluazifop-p-butyl (Fusilade Forte) / Eggplant, Shallots, Spring onions, Leeks, Garlic, Parsnips & Sweetpotato / Various Grass Weeds | 16-Apr-14 | 31-Mar-18 | Growcom | All states (excl. Vic) |
| **BRASSICAS** | | | | | |
| PER10090 | Abamectin / Sweet Corn, Spring onions and shallots (field only) and chillies and paprika (PC and field) / Two-spotted mite | 30-May-14 | 30-Jun-17 | Growcom | All states (excl. Vic) |

| Permit number | Permit description | Date Issued | Expiry Date | Permit holder | States |
|---|---|---|---|---|---|
| PER10272 | Methabenzthiazuron (Tribunil) / Leeks, Spring Onions and Shallots / Various broadleaf and grass weeds | 1-Jul-14 | 30-Jun-16 | Growcom | All states (excl. Vic) |
| PER11951 | Copper (Copper Oxychloride/Cuprous Oxide/Cupric Hydroxide) / Spring onions & shallots / Downy mildew | 1-Oct-14 | 30-Sep-19 | Growcom | All states (excl. Vic) |
| PER12221 | Phorate (Thimet) / Eggplant, peppers, shallots and spring onions / Aphids, jassids, mites, thrips and onion maggot | 14-Aug-11 | 31-Jul-16 | Growcom | All states (excl. Vic) |
| PER12396 | Iprodione / Brussels sprout / Grey Mould | 12-Jan-10 | 1-Aug-15 | Growcom | All states (excl. Vic) |
| PER12947 | Diazinon 800 / Leeks, Cauliflower / Leeks - Onion fly, Cauliflower - onion seedling maggot | 13-Aug-13 | 30-Sep-16 | Growcom | All states (excl. Vic) |
| PER13147 | Phosphorous acid / Brussels sprout, broccoli, cauliflower, spinach, silverbeet, endive, radicchio, chicory & processing peas / Downy mildew | 1-Nov-10 | 31-Mar-15 | Growcom | All states (excl. Vic) |
| PER13672 | Petroleum oil / Alliums, brassica vegetables, celery, cucurbits, eggplant, leafy vegetables, lettuce, okra, peppers, snow & sugar snap peas, tomatoes, Rocket, parsley / Specified insect pests | 29-Jun-12 | 30-Nov-17 | Growcom | All states (excl. Vic) |
| PER14037 | Pendimethalin / Horseradish / Annual grasses and Broadleaf weeds as per label | 31-Oct-13 | 30-Jun-15 | Growcom | All states (excl. Vic) |
| PER14038 | Bifenthrin (Talstar) / Cucumber, Brassica vegetables, Lettuce, Beans, Peppers, Eggplant and Peas / Specified whitefly and mite species | 7-May-12 | 30-Apr-15 | Growcom | All states (excl. Vic) |
| PER14045 | Cylopyralid (Lontrel) / Cauliflower / Capeweed and Clover | 21-Nov-11 | 30-Sep-16 | Growcom | WA |
| PER14051 | Chlorpyrifos / Brassicas / Vegetable beetle adults | 1-Oct-12 | 30-Sep-14 | Growcom | WA |
| PER14127 | Alpha-cypermethrin / Cauliflower / Staphylinid beetle | 1-May-13 | 31-Mar-23 | Growcom | WA |
| PER14164 | Copper (Copper Oxychloride/Cuprous Oxide/Cupric Hydroxide) / Endive, chicory, brassica leafy vegetables, eggplant, snow peas, sugar snap peas, paprika, chilli, horseradish / various diseases | 1-Apr-13 | 30-Sep-23 | Growcom | All states (excl. Vic) |
| PER14184 | Mancozeb + Metalaxyl / Brassica leafy vegetables, brassicas, chicory, endive, radicchio, rocket, carrot, parsnip / Various fungal diseases | 1-Apr-13 | 31-Mar-18 | Growcom | All states (excl. Vic) |
| PER14292 | Iprodione / Broccoli seed treatment / Rhizoctinia | 1-May-13 | 31-Mar-18 | Growcom | All states |
| PER14352 | Pendimethalin / Brassica leafy vegetables, Rocket / various weeds (listed on label) | 31-Oct-13 | 31-Aug-18 | Growcom | All states (exc Vic) |
| PER14384 | Clethodim (Select herbicide) / Brassica Vegetables (Broccoli, Brussels sprout & cauliflower) / Ryegrass & winter grass | 11-Oct-13 | 30-Jun-17 | Growcom | All states (excl. Vic) |
| PER14432 | Phosphorous (phosphonic) acid / Beetroot, Carrot, Parsnip & Brassica leafy vegetables / Damping off and downy mildew | 1-Jul-13 | 30-Jun-17 | Growcom | All states (excl. Vic) |
| PER14596 | Chlorfenapyr (Secure 360 SC) / Field Grown Brassica leafy vegetables & Rocket / Diamondback moth, cabbage white butterfly, Heliothis & Two-spotted mite | 24-Dec-13 | 31-Mar-16 | Growcom | All states (excl. Vic) |
| **CORN** | | | | | |
| PER10761 | Metalaxyl-M & Fludioxonil / Broccoli / Damping-off (pythium & Phytophthora sp.) and Rhizoctonia | 28-Jan-14 | 31-Mar-19 | Growcom | All states (excl. Vic) |
| PER13116 | Pyriproxyfen (Admiral) / Broccoli, Brussels sprout, Cabbage & Cauliflower / Silverleaf whitefly | 13-Jul-14 | 30-Jun-18 | Growcom | NSW, Qld & NT only |
| PER14536 | Pendimethalin / Brussels sprout / Grasses and Broadleaf Weeds | 23-May-14 | 30-Jun-19 | Growcom | ACT, NSW |
| **CUCURBITS** | | | | | |
| PER10761 | Chlorpyrifos / Brassicas / Vegetable beetle adults | 1-Oct-14 | 30-Sep-19 | Growcom | WA |
| PER10979 | Pymetrozine (Chess Insecticide) / Cucumber, capsicum, eggplant, lettuce (Protected Cropping) and Sweet corn (field) / Various aphids | 4-Apr-14 | 31-May-15 | Growcom | All states (excl. Vic) |
| PER11564 | Propiconazole / Sweet Corn / Northern Corn Leaf Blight | 8-Feb-12 | 31-Mar-16 | Growcom | All states (excl. Vic) |
| PER11768 | Abamectin / Sweet Corn, Spring onions and shallots (field only) and chillies and paprika (PC and field) / Two-spotted mite | 30-May-14 | 30-Jun-17 | Growcom | All states (excl. Vic) |
| PER11948 | Pymetrozine (Chess Insecticide) / Cucumber, capsicum, eggplant, lettuce (Protected Cropping) and Sweet corn (field) / Various aphids | 4-Apr-14 | 31-May-15 | Growcom | All states (excl. Vic) |
| PER12221 | Bupirimate (Nimrod Fungicide) / Cucurbits & Peppers / Powdery mildew | 31-Mar-09 | 30-Sep-14 | Growcom | All states (excl. Vic) |
| PER12391 | Cyprodinil + fludioxonil (Switch) / Cucumbers, Capsicum, Lettuce (head varieties only) / Botrytis & Sclerotinia | 28-May-12 | 30-Nov-14 | Growcom | All states (excl. Vic) |
| PER12447 | Chlorpyrifos / Pumpkin / African Black Beetle | 28-Jun-13 | 31-Mar-16 | Growcom | ACT, Qld, SA, Tas, NT& WA |
| PER12712 | Methomyl (Lannate L) / Specified - fruiting vegetables (cucurbits), specified - fruiting vegetables (other than cucurbits), specified - Root & tuber vegetables (bulb only), ginger, parsley, rakkyo, shallot, silverbeet, tumeric & celery / Helicoverpa spp., cucumber moth, cluster caterpillar, loopers, webworm, rutherglen bug, thrips including Western flower thrips | 9-Mar-14 | 30-Sep-17 | Growcom | All states (excl. Vic) |

| Permit number | Permit description | Date Issued | Expiry Date | Permit holder | States |
|---|---|---|---|---|---|
| PER12906 | Petroleum oil / Alliums, brassica vegetables, celery, cucurbits, eggplant, leafy vegetables, lettuce, okra, peppers, snow & sugar snap peas, tomatoes, Rocket, parsley / Specified insect pests | 29-Jun-12 | 30-Nov-17 | Growcom | All states (excl. Vic) |
| PER12947 | Methoxyfenozide (Prodigy) / Cucumber, Peppers, Eggplant, Leafy lettuce / Lepidopteran pests | 31-May-13 | 30-Sep-17 | Growcom | All states |
| PER12998 | Fenahexamid (Teldor 500 SC Fungicide) / Peppers (capcicum & chilli), cucumbers and lettuce (head & leafy) / Grey Mould or Botrytis rot | 30-Oct-13 | 31-May-16 | Growcom | All states (excl. Vic) |
| PER13031 | Buprofezin (Applaud) / Cucumber, Zucchini, Squash/Marrow, Choko, Eggplant, Peppers, Capsicum, Lettuce - leafy varieties / Greenhouse whitefly, sweetpotato whitefly, Silverleaf whitefly, Whitefly, Leafy lettuce - Jassids, leafhoppers, Greenhouse whitefly | 13-May-14 | 31-Mar-17 | Growcom | All states (excl. Vic) |
| PER13111 Version 3 | Bifenazate (Acramite Miticide) / Cucumbers, peppers, zucchini, eggplant, bitter melon, sin qua, snake beans & tomatoes / Two-spotted mite | 21-Oct-13 | 31-Mar-18 | Growcom | All states (excl. Vic) |
| PER13304 | Bifenthrin (Talstar) / Cucumber, Brassica vegetables, Lettuce, Beans, Peppers, Eggplant and Peas / Specified whitefly and mite species | 7-May-12 | 30-Apr-15 | Growcom | All states (excl. Vic) |
| PER13349 | Azoxystrobin (Amistar) / Cucumber (greenhouse) / Alternaria Leaf Spot (Alternaria cucumerina) | 30-Nov-12 | 30-Sep-14 | Growcom | All states (excl. Vic) |
| PER13395 | Maldison / Capsicums and Cucumbers / Fruit Fly | 6-Oct-11 | 31-May-16 | Growcom | All states (except Tas & Vic) |
| PER13695 | Pymetrozine (Chess Insecticide) / cucurbits, eggplant, lettuce, broccoli, chicory, endive, radicchio / Silverleaf whitefly, Lettuce aphid | 20-Feb-12 | 31-May-15 | Growcom | All states (excl. Vic) |
| PER13920 | Etoxazole (Paramite) / Curcubits / Two spotted mite, Red spider mite | 12-Jul-13 | 30-Jun-18 | Growcom | All states (excl. Vic) |
| PER14043 | Tebufenpyrad (Pyranica) / Cucumbers / Two-spotted mite | 3-Apr-12 | 31-Mar-15 | Growcom | NT, SA, WA |
| PER14043 | Potassium Bicarbonate (Ecocarb) / Parsnip, radish, swede, turnip, snow peas, sugar snap peas, silverbeet, cucumber, peppers, tomatoes, lettuce, herbs, brassica leafy vegetables / Powdery mildew | 31-Oct-12 | 30-Sep-17 | Growcom | All states (excl. Vic) |
| PER14046 | Potassium salts of fatty acids / Glasshouse and hydroponically grown capsicums, lettuce and cucumbers / Glasshouse whitefly and Silverleaf whitefly | 1-Mar-13 | 31-Mar-18 | Growcom | All states (excl. Vic) |
| PER14050 | Chlorothalonil (Bravo 720 SC) / Beetroot, Celeriac, Parsnip, Cucumbers / Various fungal diseases in a range of crops - refer to permit | 16-Apr-14 | 30-Nov-18 | Growcom | All states (excl. Vic) |
| PER14077 | Chlorothalonil (Bravo 720 SC) / Beetroot, Celeriac, Parsnip, Cucumbers / Various fungal diseases in a range of crops - refer to permit | 16-Apr-14 | 30-Nov-18 | Growcom | All states (excl. Vic) |
| PER14326 | Mancozeb / Cucumbers / Grey Mould | 1-May-13 | 31-Mar-18 | Growcom | All states (excl. Vic) |
| PER14433 | Trifloxystrobin (Flint 500 WG) / Cucumbers and capsicums (protected) / Powdery mildew | 1-Jun-13 | 30-Jun-23 | Growcom | All states (excl. Vic) |
| PER14433 | Emulsifiable Botanical oil (ECO-OIL) / Capsicum, cucumbers, lettuce / Silverleaf Whitefly | 1-Oct-13 | 30-Sep-23 | Growcom | All states (excl. Vic) |
| PER14694 | Captan Fungicide / Protected Cropping - Capsicums, chilli peppers, cucumbers, leafy lettuce / Grey Mould | 19-Dec-13 | 30-Nov-16 | Growcom | All states (excl. Vic) |
| PER14840 | Alpha-cypermethrin / Cucumber, Rocket, Silverbeet, Spinach, Brassica Leafy Vegetables, Radish / Loopers, Vegetable weevil, Plague thrips, Redlegged earth mite, cabbage white butterfly, Cluster caterpillar, heliothis | 31-Jan-14 | 30-Jun-17 | Growcom | All states (excl. Vic) |
| PER7909 | Alpha-cypermethrin / Cucumber, Rocket, Silverbeet, Spinach, Brassica Leafy Vegetables, Radish / Loopers, Vegetable weevil, Plague thrips, Redlegged earth mite, cabbage white butterfly, Cluster caterpillar, heliothis | 31-Jan-14 | 30-Jun-17 | Growcom | All states (excl. Vic) |
| **FRUITING VEGETABLES** | | | | | |
| PER10145 | Bacillius Thuringiensis Subsp (Vectobac) / Capsicums, cucumber, eggplants, herbs, lettuce (Protected Cropping) / Fungus gnats | 01-Jun-14 | 30-Jun-19 | Growcom | All states (excl. Vic) |
| PER10761 | Bupirimate (Nimrod Fungicide) / Cucurbits & Peppers / Powdery mildew | 1-Oct-14 | 30-Sep-19 | Growcom | All states (excl. Vic) |
| PER10979 | Pyrimethanil (Scala) / Cucumber / Botrytis Rot | 5-Apr-12 | 30-Sep-17 | Growcom | All states (excl. Vic) |
| PER11440 | Pymetrozine (Chess Insecticide) / Cucumber, capsicum, eggplant, lettuce (Protected Cropping) and Sweet corn (field) / Various aphids | 4-Apr-14 | 31-May-15 | Growcom | All states (excl. Vic) |
| PER11451 | Bupirimate (Nimrod Fungicide) / Cucurbits & Peppers / Powdery mildew | 31-Mar-09 | 30-Sep-14 | Growcom | All states (excl. Vic) |
| PER11564 | Procymidone (Sumiclex 500) / Peppers / Sclerotinia rot | 1-Jun-09 | 31-Jan-15 | Growcom | All states (excl. Vic) |
| PER11778 | Chlorothalonil (Bravo) / Garden Peas, Eggplant & Radish / Garden Peas - Black Spot, Eggplant - Grey Mould, Alternaria, Downy Mildew & Grey Leaf Spot, Radish - Alternaria, Downy Mildew, Grey Leaf Spot & White Rust | 12-Jun-13 | 30-Jun-18 | Growcom | All states (excl. Vic) |
| PER11948 | Cyprodinil + fludioxonil (Switch) / Cucumbers, Capsicum, Lettuce (head varieties only) / Botrytis & Sclerotinia | 28-May-12 | 30-Nov-14 | Growcom | All states (excl. Vic) |

| Permit number | Permit description | Date Issued | Expiry Date | Permit holder | States |
|---|---|---|---|---|---|
| PER12378 | Phosphorous acid (Agri-fos 600) / Capsicums & Eggplant / Phytophthora soil fungus | 29-Jun-11 | 30-Nov-15 | Growcom | All states (excl. Vic) |
| PER12391 | Methomyl (Lannate L) / Specified - fruiting vegetables (cucurbits), specified - fruiting vegetables (other than cucurbits), specified - Root & tuber vegetables (bulb only), ginger, parsley, rakkyo, shallot, silverbeet, tumeric & celery / Helicoverpa spp., cucumber moth, cluster caterpillar, loopers, webworm, rutherglen bug, thrips including Western flower thrips | 9-Mar-14 | 30-Sep-17 | Growcom | All states (excl. Vic) |
| PER12399 | Acephate / Ornamentals, Tomatoes & Peppers / Western flower thrips | 25-Oct-10 | 31-Oct-15 | Growcom | All states (excl. Vic) |
| PER12442 | Methoxyfenozide (Prodigy) / Cucumber, Peppers, Eggplant, Leafy lettuce / Lepidopteran pests | 31-May-13 | 30-Sep-17 | Growcom | All states |
| PER12447 | Mancozeb + Metalaxyl-M (Ridomil Gold MZ Systemic & Protective Fungicide) / Snow peas, sugar snap peas, Field grown capsicums, chillies & paprika / Downy Mildew | 17-Oct-13 | 30-Sep-16 | Growcom | All states (excl. Vic) |
| PER12506 | Trichlorfon / Eggplant, Pepino & Cape gooseberry (field) / Queensland Fruit Fly & Mediterranean Fruit fly | 10-Aug-11 | 31-May-16 | Growcom | All states (excl. Vic) |
| PER12565 | Fenahexamid (Teldor 500 SC Fungicide) / Peppers (capcicum & chilli), cucumbers and lettuce (head & leafy) / Grey Mould or Botrytis rot | 30-Oct-13 | 31-May-16 | Growcom | All states (excl. Vic) |
| PER12712 | Dimethoate / Eggplant / Queensland fruit fly & Mediterranean fruit fly | 30-Jan-13 | 5-Oct-14 | Growcom | All states |
| PER12823 | Pyrimethanil (Scala) / Capsicum and Lettuce / Botrytis rots | 5-Apr-12 | 30-Sep-17 | Growcom | All states (excl. Vic) |
| PER12906 | Buprofezin (Applaud) / Cucumber, Zucchini, Squash/Marrow, Choko, Eggplant, Peppers, Capsicum, Lettuce - leafy varieties / Greenhouse whitefly, sweetpotato whitefly, Silverleaf whitefly, Whitefly, Leafy lettuce - Jassids, leafhoppers, Greenhouse whitefly | 13-May-14 | 31-Mar-17 | Growcom | All states (excl. Vic) |
| PER12947 | Trifluralin / Peppers (including Capsicum, Chillies, Paprika) and Eggplant / Various Broad Leaf and Grass Weeds. | 11-May-11 | 30-Jun-21 | Growcom | All states (excl. Vic) |
| PER13031 | Bifenazate (Acramite Miticide) / Cucumbers, peppers, zucchini, eggplant, bitter melon, sin qua, snake beans & tomatoes / Two-spotted mite | 21-Oct-13 | 31-Mar-18 | Growcom | All states (excl. Vic) |
| PER13122 | Bifenthrin (Talstar) / Cucumber, Brassica vegetables, Lettuce, Beans, Peppers, Eggplant and Peas / Specified whitefly and mite species | 7-May-12 | 30-Apr-15 | Growcom | All states (excl. Vic) |
| PER13254 | Maldison / Capsicums and Cucumbers / Fruit Fly | 6-Oct-11 | 31-May-16 | Growcom | All states (except Tas & Vic) |
| PER13351 | Emamectin (Proclaim) / Celery (field), Eggplant (field & PC) / Heliothis, Lightbrown apple moth, Cluster caterpillar | 31-Oct-13 | 30-Sep-16 | Growcom | All states (excl. Vic) |
| PER13395 | Dimethoate / Chilli peppers / Queensland and Mediterranean Fruit Fly | 2-Feb-12 | 5-Oct-14 | Growcom | All states |
| PER13397 | Pirimicarb (Pirimor) / Eggplant / Aphids | 28-Jun-13 | 31-Mar-16 | Growcom | All states (excl. Vic) |
| PER13517 | Clethodim (Select herbicide) / Peas (green & processing), Eggplant or Aubergine, Chilli peppers, Paprika, Silverbeet & Spinach / Annual ryegrass & winter grass | 15-Nov-13 | 31-Dec-16 | Growcom | All states (excl. Vic) |
| PER13566 | Iprodione (Rovral) / Eggplant / Grey mould | 1-Nov-12 | 30-Sep-15 | Growcom | All states (excl. Vic) |
| PER13567 | Methomyl (Lannate L) / Tomatoes & Capsicums / Fruit Fly | 7-Dec-12 | 30-May-16 | Growcom | Bowen & Gumlu Qld |
| PER13656 | Bifenthrin (Talstar) / Tomatoes & Capsicums / Fruit Fly | 7-Dec-12 | 30-May-16 | Growcom | Bowen & Gumlu Qld |
| PER13695 | Iprodione (Rovral) / Carrots, Chillies and Paprika / Various Diseases | 25-Jan-13 | 30-Sep-14 | Growcom | All states (excl. Vic) |
| PER13860 | Potassium Bicarbonate (Ecocarb) / Parsnip, radish, swede, turnip, snow peas, sugar snap peas, silverbeet, cucumber, peppers, tomatoes, lettuce, herbs, brassica leafy vegetables / Powdery mildew | 31-Oct-12 | 30-Sep-17 | Growcom | All states (excl. Vic) |
| PER13901 | Fenthion (Lebaycid) / Chilli peppers / Fruit Fly | 7-Dec-12 | 30-Oct-14 | Growcom | All states |
| PER13920 | Glyphosate / Capsicums - Snow Peas - Sugar Snap Peas / Annual and Perennial Grass and Broadleaf Weeds (shielded sprayer) | 6-Apr-13 | 30-Jun-19 | Growcom | NSW, Qld |
| PER14036 | Potassium salts of fatty acids / Glasshouse and hydroponically grown capsicums, lettuce and cucumbers / Glasshouse whitefly and Silverleaf whitefly | 1-Mar-13 | 31-Mar-18 | Growcom | All states (excl. Vic) |
| PER14038 | Bupirimate (Nimrod Fungicide) / Eggplant / Powdery mildew | 1-Apr-13 | 31-Mar-18 | Growcom | All states (excl. Vic) |
| PER14047 | Copper (Copper Oxychloride/Cuprous Oxide/Cupric Hydroxide) / Endive, chicory, brassica leafy vegetables, eggplant, snow peas, sugar snap peas, paprika, chilli, horseradish / various diseases | 1-Apr-13 | 30-Sep-23 | Growcom | All states (excl. Vic) |
| PER14050 | Methidathion (Supracide 400) / Peppers and eggplant / Rutherglen Bug | 1-Jun-13 | 30-Jun-18 | Growcom | All states (excl. Vic) |
| PER14077 | Trifloxystrobin (Flint 500 WG) / Cucumbers and capsicums (protected) / Powdery mildew | 1-Jun-13 | 30-Jun-23 | Growcom | All states (excl. Vic) |

| Permit number | Permit description | Date Issued | Expiry Date | Permit holder | States |
|---|---|---|---|---|---|
| PER14144 | Emulsifiable Botanical oil (ECO-OIL) / Capsicum, cucumbers, lettuce / Silverleaf Whitefly | 1-Oct-13 | 30-Sep-23 | Growcom | All states (excl. Vic) |
| PER14186 | Pirimicarb (Pirimor) / Peppers, Chilli / Aphids | 5-Apr-13 | 31-Mar-16 | Growcom | Qld |
| PER14326 | Spinetoram (Success Neo) / Eggplant or Aubergine / Melon Thrips | 3-Oct-13 | 30-Sep-18 | Growcom | All states (exc Vic) |
| PER14353 | Captan Fungicide / Protected Cropping - Capsicums, chilli peppers, cucumbers, leafy lettuce / Grey Mould | 19-Dec-13 | 30-Nov-16 | Growcom | All states (excl. Vic) |
| PER14454 | Iprodione (Rovral) / Peppers (capsicum, chillies & paprika) Field & PC and Celeriac (field) / Sclerotinia rot | 1-Jul-14 | 31-Mar-17 | Growcom | All states (excl. Vic) |
| PER14484 | Mancozeb + Metalaxyl-M (Ridomil Gold MZ Systemic & Protective Fungicide) / Field grown peppers (capsicums, chillies & paprika) / Downy Mildew | 10-Mar-14 | 30-Jun-19 | Growcom | NSW & Qld |
| PER14536 | Fluazifop-p-butyl (Fusilade Forte) / Eggplant, Shallots, Spring onions, Leeks, Garlic, Parsnips & Sweetpotato / Various Grass Weeds | 16-Apr-14 | 31-Mar-18 | Growcom | All states (excl. Vic) |
| PER14593 | Abamectin / Sweet Corn, Spring onions and shallots (field only) and chillies and paprika (PC and field) / Two-spotted mite | 30-May-14 | 30-Jun-17 | Growcom | All states (excl. Vic) |
| PER14694 | Mancozeb / Specified fruiting and legume vegetables / Downy Mildew, Anthracnose & Alternaria | 10-Jul-14 | 30-Jun-20 | Growcom | All states (excl. Vic) |
| PER14839 | Bacillius Thuringiensis Subsp (Vectobac) / Capsicums, cucumber, eggplants, herbs, lettuce (Protected Cropping) / Fungus gnats | 01-Jun-14 | 30-Jun-19 | Growcom | All states (excl. Vic) |
| PER14840 | Zineb (Barmac Zineb Fungicide) / Eggplant, spinach, silverbeet / Anthracnose | 1-Aug-14 | 30-Sep-19 | Growcom | All states (excl. Vic) |
| PER8930 | Bupirimate (Nimrod Fungicide) / Cucurbits & Peppers / Powdery mildew | 1-Oct-14 | 30-Sep-19 | Growcom | All states (excl. Vic) |
| **LEGUME VEGETABLES** | | | | | |
| PER10976 | Bentazone-sodium (Basagran) / Snow peas and sugar snap peas / Broadleaf weeds | 10-Aug-09 | 31-Mar-15 | Growcom | All states (excl. Vic) |
| PER10988 | Cyanazine (Bladex 900 WG) / Snow peas and sugar snap peas / Broadleaf weeds | 10-Aug-09 | 31-Mar-15 | Growcom | All states (excl. Vic) |
| PER11451 | Chlorothalonil (Bravo) / Garden Peas, Eggplant & Radish / Garden Peas - Black Spot, Eggplant - Grey Mould, Alternaria, Downy Mildew & Grey Leaf Spot, Radish - Alternaria, Downy Mildew, Grey Leaf Spot & White Rust | 12-Jun-13 | 30-Jun-18 | Growcom | All states (excl. Vic) |
| PER11951 | Phosphorous acid / Brussels sprout, broccoli, cauliflower, spinach, silverbeet, endive, radicchio, chicory & processing peas / Downy mildew | 1-Nov-10 | 31-Mar-15 | Growcom | All states (excl. Vic) |
| PER11964 | Chlorothalonil (Bravo) / Snow peas & sugar snap peas / Downy mildew & Chocolate spot | 13-Nov-12 | 31-Mar-18 | Growcom | All states (excl. Vic) |
| PER12221 | Petroleum oil / Alliums, brassica vegetables, celery, cucurbits, eggplant, leafy vegetables, lettuce, okra, peppers, snow & sugar snap peas, tomatoes, Rocket, parsley / Specified insect pests | 29-Jun-12 | 30-Nov-17 | Growcom | All states (excl. Vic) |
| PER12392 | Bentazone-sodium (Basagran) / Green Peas (processing) / Broadleaf weeds | 5-Nov-10 | 30-Sep-14 | Growcom | Tas |
| PER12399 | Mancozeb + Metalaxyl-M (Ridomil Gold MZ Systemic & Protective Fungicide) / Snow peas, sugar snap peas, Field grown capsicums, chillies & paprika / Downy Mildew | 17-Oct-13 | 30-Sep-16 | Growcom | All states (excl. Vic) |
| PER12846 | Abamectin / Lettuce (hydroponic), Snow Peas & Sugar Snap Peas / Two spotted mite | 31-May-13 | 30-Sep-17 | Growcom | All states (excl. Vic) |
| PER12906 | Bifenazate (Acramite Miticide) / Cucumbers, peppers, zucchini, eggplant, bitter melon, sin qua, snake beans & tomatoes / Two-spotted mite | 21-Oct-13 | 31-Mar-18 | Growcom | All states (excl. Vic) |
| PER12947 | Bifenthrin (Talstar) / Cucumber, Brassica vegetables, Lettuce, Beans, Peppers, Eggplant and Peas / Specified whitefly and mite species | 7-May-12 | 30-Apr-15 | Growcom | All states (excl. Vic) |
| PER13395 | Clethodim (Select herbicide) / Peas (green & processing), Eggplant or Aubergine, Chilli peppers, Paprika, Silverbeet & Spinach / Annual ryegrass & winter grass | 15-Nov-13 | 31-Dec-16 | Growcom | All states (excl. Vic) |
| PER13397 | Metolachlor (Dual Gold) / Silverbeet, Spring onions, Shallots, Green beans and Navy beans / Various broadleaf and grass weeds. | 23-Jul-12 | 30-Jun-17 | Growcom | All states (excl. Vic) |
| PER13626 | Potassium Bicarbonate (Ecocarb) / Parsnip, radish, swede, turnip, snow peas, sugar snap peas, silverbeet, cucumber, peppers, tomatoes, lettuce, herbs, brassica leafy vegetables / Powdery mildew | 31-Oct-12 | 30-Sep-17 | Growcom | All states (excl. Vic) |
| PER13695 | Etoxazole (Paramite) / Snow or Sugar Snap Peas / Two Spotted Mite | 1-Jan-13 | 31-Mar-15 | Growcom | All states (excl. Vic) |
| PER13899 | Glyphosate / Capsicums - Snow Peas - Sugar Snap Peas / Annual and Perennial Grass and Broadleaf Weeds (shielded sprayer) | 6-Apr-13 | 30-Jun-19 | Growcom | NSW, Qld |
| PER13901 | Lambda-cyhalothrin (Karate Zeon) / Snow Peas and Sugar Snap Peas / Pasture Webworm, Cutworm, Rutherglen Bug and Thrips | 1-Jun-13 | 31-May-18 | Growcom | All states (excl. Vic) |
| PER14033 | Diflufenican (Brodal Options selective herbicide) / Peas / Broadleaf weeds | 1-May-13 | 31-Mar-23 | Growcom | All states (excl. Vic) |

| Permit number | Permit description | Date Issued | Expiry Date | Permit holder | States |
|---|---|---|---|---|---|
| PER14035 | Copper (Copper Oxychloride/Cuprous Oxide/Cupric Hydroxide) / Endive, chicory, brassica leafy vegetables, eggplant, snow peas, sugar snap peas, paprika, chilli, horseradish / various diseases | 1-Apr-13 | 30-Sep-23 | Growcom | All states (excl. Vic) |
| PER14038 | Bifenazate / Snow peas & Sugar snap peas / Two spotted mite, Red tomato spider mite, European red mite, Bryobia mite | 12-Mar-14 | 30-Nov-15 | Growcom | All states (excl. Vic) & NT |
| PER14044 | Pymetrozine (Chess Insecticide) / Snow peas and sugar snap peas / Aphids | 1-Jul-13 | 30-Jun-15 | Growcom | All states (excl. Vic) |
| PER14185 | Fenhexamid (Teldor) / Snowpeas and Sugar Snap peas / Grey Mould and Chocolate spot | 27-Nov-13 | 30-Sep-16 | Growcom | All states |
| PER14211 | Dimethomorph + mancozeb (Acrobat) / Snow peas / Downy mildew | 1-May-14 | 30-Apr-17 | Growcom | All states (excl. Vic) |
| PER14470 | Pyrimethanil / Snow peas and Sugar snap peas / Grey Mould (Botrytis cinerea) | 1-Jul-14 | 30-Jun-19 | Growcom | All states (excl. Vic) |
| PER14505 | Chlorpyrifos / Swede turnip, brassica leafy vegetables, silverbeet, spinach, celery, beans, snow peas & sugar snap peas, parsley, sweetpotato / African black beetle, False wireworms, Wireworms, Vegetable weevil | 1-Apr-14 | 31-Mar-19 | Growcom | All states (excl. Vic) |
| PER14583 | Mancozeb / Specified fruiting and legume vegetables / Downy Mildew, Anthracnose & Alternaria | 10-Jul-14 | 30-Jun-20 | Growcom | All states (excl. Vic) |
| PER14593 | Pirimicarb (Pirimor) / Celeriac / Aphids | 7-May-12 | 30-Sep-15 | Growcom | All states (excl. Vic) |
| **LEAFY VEGETABLES** | | | | | |
| PER10677 | Phorate (Thimet) / Eggplant, peppers, shallots and spring onions / Aphids, jassids, mites, thrips and onion maggot | 14-Aug-11 | 31-Jul-16 | Growcom | All states (excl. Vic) |
| PER10761 | Propyzamide / Chicory & Endive / Grass and Broadleef weeds | 14-Apr-08 | 30-Apr-18 | Growcom | All states (excl. Vic) |
| PER10845 | Pymetrozine (Chess Insecticide) / Cucumber, capsicum, eggplant, lettuce (Protected Cropping) and Sweet corn (field) / Various aphids | 4-Apr-14 | 31-May-15 | Growcom | All states (excl. Vic) |
| PER11352 | Zineb (Barmac Zineb Fungicide) / Brassica leafy vegetables / Cercospora leaf spot & Downy mildew | 11-Jun-09 | 31-Mar-15 | Growcom | All states (excl. Vic) |
| PER11438 | Chlorothalonil & Pyrimethanil (Walabi Fungicide) / Chicory, Endive, Radicchio, Silverbeet and Spinach / Botrytis and Alternaria | 25-Nov-09 | 30-Sep-14 | Growcom | All states (excl. Vic) |
| PER11564 | Glyphosate / parsley, coriander, brassica leafy vegetables, chicory, endive, radicchio, spinach, silverbeet, turnip, swede / Grass and broadleaf weeds (shielded sprayer) | 5-May-09 | 30-Jun-19 | Growcom | All states |
| PER11686 | Cyprodinil + fludioxonil (Switch) / Cucumbers, Capsicum, Lettuce (head varieties only) / Botrytis & Sclerotinia | 28-May-12 | 30-Nov-14 | Growcom | All states (excl. Vic) |
| PER11848 | Clethodim (Select herbicide) / Brassica Leafy Vegetables, Chicory, Endive & Radicchio / Grass Weeds | 20-Jun-12 | 30-Sep-15 | Growcom | All states (excl. Vic) |
| PER11850 | Lambda-cyhalothrin (Karate Zeon) / Parsley & Coriander / Red Legged Earth Mite, Rutherglen Bug, Looper, Plague Thrips, onion maggot, onion thrips | 5-Apr-12 | 31-Aug-15 | Growcom | All states (excl. Vic) |
| PER11951 | Phosphorous acid / Brussels sprout, broccoli, cauliflower, spinach, silverbeet, endive, radicchio, chicory & processing peas / Downy mildew | 1-Nov-10 | 31-Mar-15 | Growcom | All states (excl. Vic) |
| PER11991 | Quinoxyfen (Legend) / Silverbeet / Powdery mildew | 29-Jun-11 | 31-Mar-16 | Growcom | All states (excl. Vic) |
| PER11994 Extended | Emamectin (Proclaim) / Brassica leafy vegetables / Diamondback moth, Heliothis and Vegetable looper | 2-Mar-12 | 31-May-15 | Growcom | All states (excl. Vic) |
| PER12008 | Propachlor (Ramrod) / Lettuce, spinach, silverbeet, rocket, Brassica leafy vegetables, spring onions and shallots / Annual grasses and broadleaf weeds | 18-Jun-12 | 30-Sep-15 | Growcom | All states (excl. Vic) |
| PER12016 | Mancozeb / Parsley, Chicory and Brassica leafy vegetables (Brassica spp.) / Anthracnose and Septoria | 12-Jun-12 | 31-Mar-15 | Growcom | All states (excl. Vic) |
| PER12221 | Petroleum oil / Alliums, brassica vegetables, celery, cucurbits, eggplant, leafy vegetables, lettuce, okra, peppers, snow & sugar snap peas, tomatoes, Rocket, parsley / Specified insect pests | 29-Jun-12 | 30-Nov-17 | Growcom | All states (excl. Vic) |
| PER12386 | Chlorthal-dimethyl (Dacthal) / Lettuce / Stinging nettle | 29-Jun-11 | 31-Aug-16 | Growcom | SA & WA only |
| PER12391 | Methoxyfenozide (Prodigy) / Cucumber, Peppers, Eggplant, Leafy lettuce / Lepidopteran pests | 31-May-13 | 30-Sep-17 | Growcom | All states |
| PER12447 | Fenahexamid (Teldor 500 SC Fungicide) / Peppers (capcicum & chilli), cucumbers and lettuce (head & leafy) / Grey Mould or Botrytis rot | 30-Oct-13 | 31-May-16 | Growcom | All states (excl. Vic) |
| PER12565 | Pyrimethanil (Scala) / Capsicum and Lettuce / Botrytis rots | 5-Apr-12 | 30-Sep-17 | Growcom | All states (excl. Vic) |
| PER12712 | Buprofezin (Applaud) / Cucumber, Zucchini, Squash/Marrow, Choko, Eggplant, Peppers, Capsicum, Lettuce - leafy varieties / Greenhouse whitefly, sweetpotato whitefly, Silverleaf whitefly, Whitefly, Leafy lettuce - Jassids, leafhoppers, Greenhouse whitefly | 13-May-14 | 31-Mar-17 | Growcom | All states (excl. Vic) |

| Permit number | Permit description | Date Issued | Expiry Date | Permit holder | States |
|---|---|---|---|---|---|
| PER12846 | Abamectin / Lettuce (hydroponic), Snow Peas & Sugar Snap Peas / Two spotted mite | 31-May-13 | 30-Sep-17 | Growcom | All states (excl. Vic) |
| PER12947 | Bifenthrin (Talstar) / Cucumber, Brassica vegetables, Lettuce, Beans, Peppers, Eggplant and Peas / Specified whitefly and mite species | 7-May-12 | 30-Apr-15 | Growcom | All states (excl. Vic) |
| PER13038 | Phosphorous acid / Culinary herbs (parsley), Strawberries, passionfruit / Phytophthora soil fungus | 1-Nov-11 | 31-Oct-14 | Growcom | All states (excl. Vic) |
| PER13111 Version 3 | Pymetrozine (Chess Insecticide) / cucurbits, eggplant, lettuce, broccoli, chicory, endive, radicchio / Silverleaf whitefly, Lettuce aphid | 20-Feb-12 | 31-May-15 | Growcom | All states (excl. Vic) |
| PER13111 Version 3 | Pymetrozine (Chess Insecticide) / cucurbits, eggplant, lettuce, broccoli, chicory, endive, radicchio / Silverleaf whitefly, Lettuce aphid | 20-Feb-12 | 31-May-15 | Growcom | All states (excl. Vic) |
| PER13121 | Metalaxyl-M (Ridomil Gold 25G) / Parsley / Pythium & Phytophthora | 16-Nov-11 | 30-Nov-16 | Growcom | All states (excl. Vic) |
| PER13154 | S-metolachlor (Dual Gold Herbicide) / Brassica Leafy Vegetables / Selected broadleaf and Grass weeds | 20-Feb-12 | 31-Mar-17 | Growcom | All states |
| PER13301 | Alpha-cypermethrin / Lettuce / Red-legged earth mite & Vegetable weevil | 12-Jun-12 | 31-May-15 | Growcom | All states (excl. Vic) |
| PER13322 | Spinetoram (Success Neo) / Specified Leafy vegetables / Potato Moth | 12-Jun-12 | 31-May-17 | Growcom | All states (excl. Vic) |
| PER13396 | Methomyl (Lannate L) / Parsley and Coriander / Thrips and Western Flower Thrips | 29-Jun-12 | 30-Jun-15 | Growcom | All states (excl. Vic) |
| PER13397 | Clethodim (Select herbicide) / Peas (green & processing), Eggplant or Aubergine, Chilli peppers, Paprika, Silverbeet & Spinach / Annual ryegrass & winter grass | 15-Nov-13 | 31-Dec-16 | Growcom | All states (excl. Vic) |
| PER13499 | Diazinon 800 / Parsley and coriander / Onion maggot | 4-May-12 | 31-Mar-17 | Growcom | All states (excl. Vic) |
| PER13626 | Metolachlor (Dual Gold) / Silverbeet, Spring onions, Shallots, Green beans and Navy beans / Various broadleaf and grass weeds. | 23-Jul-12 | 30-Jun-17 | Growcom | All states (excl. Vic) |
| PER13658 | Trifloxystrobin (Flint 500 WG) / Celery, Silverbeet, Spinach, Chicory and Endive / Various diseases | 1-Nov-12 | 30-Sep-14 | Growcom | All states (excl. Vic) |
| PER13673 | Metalyaxyl-M & Mancozeb (Ridomil Gold MZ WG) / Celery, Silverbeet & Spinach / Late Blight, Septoria Leaf Blight & Downy Mildew | 22-Apr-13 | 30-Sep-16 | Growcom | All states (excl. Vic) |
| PER13695 | Potassium Bicarbonate (Ecocarb) / Parsnip, radish, swede, turnip, snow peas, sugar snap peas, silverbeet, cucumber, peppers, tomatoes, lettuce, herbs, brassica leafy vegetables / Powdery mildew | 31-Oct-12 | 30-Sep-17 | Growcom | All states (excl. Vic) |
| PER13698 | Phosphorous acid / Lettuce (leaf and hydroponic), Fennel and Bulb (Allium) Vegetables / Downy Mildew | 1-Oct-12 | 30-Sep-17 | Growcom | All states (excl. Vic) |
| PER13920 | Potassium salts of fatty acids / Glasshouse and hydroponically grown capsicums, lettuce and cucumbers / Glasshouse whitefly and Silverleaf whitefly | 1-Mar-13 | 31-Mar-18 | Growcom | All states (excl. Vic) |
| PER14032 | Chlorthal-dimethyl (Dacthal) / Parsley / Various broadleaf weeds and grasses | 1-May-13 | 31-Mar-23 | Growcom | All states (excl. Vic) |
| PER14038 | Copper (Copper Oxychloride/Cuprous Oxide/Cupric Hydroxide) / Endive, chicory, brassica leafy vegetables, eggplant, snow peas, sugar snap peas, paprika, chilli, horseradish / various diseases | 1-Apr-13 | 30-Sep-23 | Growcom | All states (excl. Vic) |
| PER14045 | Mancozeb + Metalaxyl / Brassica leafy vegetables, brassicas, chicory, endive, radicchio, rocket, carrot, parsnip / Various fungal diseases | 1-Apr-13 | 31-Mar-18 | Growcom | All states (excl. Vic) |
| PER14077 | Emulsifiable Botanical oil (ECO-OIL) / Capsicum, cucumbers, lettuce / Silverleaf Whitefly | 1-Oct-13 | 30-Sep-23 | Growcom | All states (excl. Vic) |
| PER14127 | Pendimethalin / Brassica leafy vegetables, Rocket / various weeds (listed on label) | 31-Oct-13 | 31-Aug-18 | Growcom | All states (excl. Vic) |
| PER14210 | Bifenazate (Acramite Miticide) / Lettuce (head & leafy varieties) / Two-spotted mite | 17-Oct-13 | 30-Sep-18 | Growcom | Qld, SA & WA only |
| PER14292 | Chlorfenapyr (Secure 360 SC) / Field Grown Brassica leafy vegetables & Rocket / Diamondback moth, cabbage white butterfly, Heliothis & Two-spotted mite | 24-Dec-13 | 31-Mar-16 | Growcom | All states (excl. Vic) |
| PER14318 | Metalaxyl-M (Ridimol Gold 25G) / Lettuce (winter crop in clay to loam soils) / Damping-off (pythium & Phytophthora sp.) | 23-Dec-13 | 30-Sep-18 | Growcom | All states (excl. Vic) |
| PER14326 | Captan Fungicide / Protected Cropping - Capsicums, chilli peppers, cucumbers, leafy lettuce / Grey Mould | 19-Dec-13 | 30-Nov-16 | Growcom | All states (excl. Vic) |
| PER14336 | Methoxyfenozide (Prodigy) / Head Lettuce (Protected - glasshouse & hydroponically grown) / Cluster caterpillar, looper & light brown apple moth | 17-Dec-13 | 30-Sep-17 | Growcom | All states |
| PER14351 | Petroleum Oil / Lettuce (greenhouse & hydroponic only) / Leafhoppers, green vegetable bug, grey cluster bug, Rutherglen bug & green mirid | 24-Dec-13 | 31-Mar-17 | Growcom | All states (excl. Vic) |
| PER14430 | Azoxystrobin (Amistar) / Lettuce / Bottom Rot | 21-Mar-14 | 30-Jun-17 | Growcom | All states (excl. Vic) |

| Permit number | Permit description | Date Issued | Expiry Date | Permit holder | States |
|---|---|---|---|---|---|
| PER14431 | Tolclofos-Methyl (Rizolex) / Lettuce (field grown) / Bottom Rot (Rhizoctonia solani) | 21-Mar-14 | 30-Jun-17 | Growcom | All states (excl. Vic) |
| PER14433 | Alpha-cypermethrin / Cucumber, Rocket, Silverbeet, Spinach, Brassica Leafy Vegetables, Radish / Loopers, Vegetable weevil, Plague thrips, Redlegged earth mite, cabbage white butterfly, Cluster caterpillar, heliothis | 31-Jan-14 | 30-Jun-17 | Growcom | All states (excl. Vic) |
| PER14456 | Tebuconazole (Folicur) / Beetroot, beetroot leaves, chicory, endive, radish, silverbeet, spinach / Sclerotinia | 1-Apr-14 | 30-Jun-19 | Growcom | All states (excl. Vic) |
| PER14457 | Alpha-cypermethrin / Chicory, Leeks, Spring Onions, Shallots / Red Legged Earth mite, onion thrips | 19-Mar-14 | 30-Jun-19 | Growcom | ACT,NSW, Qld, Tas, NT & WA only |
| PER14479 | Propiconazole / Spinach, Beetroot, Celery, Silverbeet, Gai Lum, Chicory, endive & Radicchio / Leaf Spot, Septoria Spot, Early Blight, Powdery Mildew, Rust & Septoria leaf spot | 12-May-14 | 31-Oct-17 | Growcom | All states (excl. Vic) |
| PER14484 | Fluazifop-p-butyl (Fusilade Forte) / Eggplant, Shallots, Spring onions, Leeks, Garlic, Parsnips & Sweetpotato / Various Grass Weeds | 16-Apr-14 | 31-Mar-18 | Growcom | All states (excl. Vic) |
| PER14494 | Trifloxystrobin (Flint 500 WG) / Celery, Silverbeet, Spinach, Chicory and Endive / Silverbeet, spinach chicory, endive - Powdery Mildew; celery - Cercospora leaf spot, Septoria leaf spot | 1-Oct-14 | 30-Jun-19 | Growcom | All states (excl. Vic) |
| PER14583 | Chlorpyrifos / Swede turnip, brassica leafy vegetables, silverbeet, spinach, celery, beans, snow peas & sugar snap peas, parsley, sweetpotato / African black beetle, False wireworms, Wireworms, Vegetable weevil | 1-Apr-14 | 31-Mar-19 | Growcom | All states (excl. Vic) |
| PER14584 | Imidacloprid (Confidor 200 SC) / Brassica leafy vegetables / Aphids, whitefly and thrips (excluding western flower thrips) | 1-Apr-14 | 31-Mar-19 | Growcom | All states (excl. Vic) |
| PER14694 | Bacillius Thuringiensis Subsp (Vectobac) / Capsicums, cucumber, eggplants, herbs, lettuce (Protected Cropping) / Fungus gnats | 01-Jun-14 | 30-Jun-19 | Growcom | All states (excl. Vic) |
| PER14696 | Abamectin (Vertimec) / Head Lettuce (field) / Two-spotted mite | 1-Apr-14 | 31-Mar-19 | Growcom | All states (excl. Vic) |
| PER14703 | Ethofumesate (Tramat 500 SC) / Spinach (Spinacia oleracea only), Silverbeet / Various Weeds | 1-Aug-14 | 31-Jul-19 | Growcom | All states (excl. Vic) |
| PER14795 | Phenmedipham (Betanal) / Lettuce, chicory, endive, radicchio, spinach, & baby spinach / Broadleaf weeds | 1-Jul-14 | 31-Dec-15 | Growcom | All states (excl. Vic) |
| PER14839 | Zineb (Barmac Zineb Fungicide) / Eggplant, spinach, silverbeet / Anthracnose | 1-Aug-14 | 30-Sep-19 | Growcom | All states (excl. Vic) |
| PER14841 | Chlorothalonil & Pyrimethanil (Walabi Fungicide) / Chicory, Endive, Radicchio, Silverbeet and Spinach / Botrytis and Alternaria | 1-Oct-14 | 30-Sep-19 | Growcom | All states (excl. Vic) |
| PER12017 | Fluazifop-p-butyl (Fusilade Forte) / Parsley, coriander, brassica leafy vegetables, chicory, endive, radicchio, spinach, silverbeet, turnip, swede / Annual Grass Weeds | 21-Oct-11 | 30-Jun-16 | Growcom | All states (excl. Vic) |
| **ROOT & TUBER VEGETABLES** | | | | | |
| PER10875 | Clethodim (Select herbicide) / Parsnip / Grass Weeds | 11-Jan-12 | 31-Mar-22 | Growcom | All states (excl. Vic) |
| PER11348 | Mancozeb / Radish, swede & turnip / Alternaria, cercospora leaf spot, white blister | 10-Aug-09 | 31-Mar-15 | Growcom | All states (excl. Vic) |
| PER11350 | Glyphosate / parsley, coriander, brassica leafy vegetables, chicory, endive, radicchio, spinach, silverbeet, turnip, swede / Grass and broadleaf weeds (shielded sprayer) | 5-May-09 | 30-Jun-19 | Growcom | All states |
| PER11438 | Propachlor / Radish, swede, turnip / Grass and Broadleaf weeds | 27-May-09 | 31-Dec-19 | Growcom | All states |
| PER11441 | Ethofumesate (Tramat) / Beetroot & Onions / Grass weeds | 8-Jun-09 | 30-Jun-15 | Growcom | Tas |
| PER11450 | Chlorothalonil (Bravo) / Garden Peas, Eggplant & Radish / Garden Peas - Black Spot, Eggplant - Grey Mould, Alternaria, Downy Mildew & Grey Leaf Spot, Radish - Alternaria, Downy Mildew, Grey Leaf Spot & White Rust | 12-Jun-13 | 30-Jun-18 | Growcom | All states (excl. Vic) |
| PER11451 | Imidacloprid (Confidor) / Beetroot / Aphids & Thrips | 10-Apr-12 | 30-Sep-15 | Growcom | All states (excl. Vic) |
| PER11853 | Triadimenol (Bayfidan ) / Parsnips, Radish, Swede, Turnip / Powdery Mildew | 5-Feb-10 | 30-Jun-17 | Growcom | All States |
| PER11935 Version 2 | Methomyl (Lannate L) / Specified - fruiting vegetables (cucurbits), specified - fruiting vegetables (other than cucurbits), specified - Root & tuber vegetables (bulb only), ginger, parsley, rakkyo, shallot, silverbeet, tumeric & celery / Helicoverpa spp., cucumber moth, cluster caterpillar, loopers, webworm, rutherglen bug, thrips including Western flower thrips | 9-Mar-14 | 30-Sep-17 | Growcom | All states (excl. Vic) |
| PER11948 | Lambda-cyhalothrin (Karate Zeon) / Beetroot & Radish / Various Insects | 1-Apr-10 | 31-Mar-15 | Growcom | All states (excl. Vic) |
| PER11949 | Tecto Flowable SC Fungicide (thiabendazole) / Sweetpotato / Field rots caused by scurf & root rot | 29-Jun-11 | 30-Sep-16 | Growcom | All states |

| Permit number | Permit description | Date Issued | Expiry Date | Permit holder | States |
|---|---|---|---|---|---|
| PER12047 | Prometryn (Gesagard) / Parsnip / Weeds | 9-May-12 | 30-Sep-15 | Growcom | All states (excl. Vic) |
| PER12048 | Boscalid (Filan Fungicide) / Bulb vegetables (not onions) and carrots / Sclerotinia rot | 28-May-12 | 30-Jun-15 | Growcom | All states |
| PER12050 | Linuron / Parsnips / Broadleaf weeds | 9-May-12 | 30-Sep-15 | Growcom | All states (excl. Vic) |
| PER12357 | Prometryn (Gesagard) / Carrots / Broadleaf weeds | 29-Nov-10 | 30-Sep-15 | Growcom | Qld |
| PER12383 | Alpha-cypermethrin / Potatoes / Garden weevil | 29-Jun-11 | 30-Apr-16 | Growcom | Tas & WA only |
| PER12612 | Spinetoram (Success Neo) / Specific Root Vegetables, Alliums (not onions) & Celeriac / Various insect pests | 29-Mar-12 | 31-Mar-17 | Growcom | All states (excl. Vic) |
| PER13088 | Alpha-cypermethrin / Beetroot & Celery / Beetroot - Loopers, vegetable weevil, plague thrips; Celery - Redlegged earth mite, leafroller caterpillar | 20-Jun-12 | 31-May-15 | Growcom | All states (excl. Vic) |
| PER13090 Version 2 | Tebuconazole (Folicur) / Carrots / Powdery mildew | 14-May-12 | 31-Mar-16 | Growcom | NSW, SA, Tas |
| PER13091 | Prometryn (Gesagard) / Celeriac / Grass Weeds listed on Label | 29-Mar-12 | 31-Mar-17 | Growcom | All states (excl. Vic) |
| PER13114 | Mouseoff and Rattoff Zinc Phosphide Baits / Sweetpotato / House Mouse and Introduced Rats | 14-Dec-11 | 31-Dec-16 | Growcom | NSW, Qld |
| PER13151 | Fipronil (Regent 200 SC) / Sweetpotato / White Fringed Weevil & Wireworm | 14-Dec-11 | 31-Dec-16 | Growcom | NSW, Qld, NT, WA |
| PER13153 | Chloranthraniliprole (Coragen) / Parsley, Coriander, Radish, Swede & Turnip / Heliothis, Cluster caterpillar | 28-May-12 | 31-Mar-15 | Growcom | All states (excl. Vic) |
| PER13303 | Glyphosate / Carrots / Certain Broadleaf and grass weeds (shielded sprayer) | 28-May-12 | 30-Jun-15 | Growcom | All states (excl. Vic) |
| PER13305 | Linuron / Leeks & Celeriac / Grass and Broadleaf weeds | 31-May-13 | 30-Apr-16 | Growcom | Qld, NSW, SA, WA, Tas |
| PER13367 | Propiconazole / Radishes / Cercospora | 1-Apr-12 | 31-Mar-17 | Growcom | NSW, Qld, SA, Tas, WA |
| PER13395 | Chlorpyrifos (Lorsban) / Taro / African Black Beetle | 11-Apr-12 | 31-Mar-22 | Growcom | All states (excl. Vic) |
| PER13444 | Iprodione (Rovral) / Carrots, Chillies and Paprika / Various Diseases | 25-Jan-13 | 30-Sep-14 | Growcom | All states (excl. Vic) |
| PER13446 | Potassium Bicarbonate (Ecocarb) / Parsnip, radish, swede, turnip, snow peas, sugar snap peas, silverbeet, cucumber, peppers, tomatoes, lettuce, herbs, brassica leafy vegetables / Powdery mildew | 31-Oct-12 | 30-Sep-17 | Growcom | All states (excl. Vic) |
| PER13656 | Trifluralin 480 / Parsnips / Winter Grass | 28-Aug-12 | 31-Mar-18 | Growcom | All states (excl. Vic) |
| PER13695 | Phorate (Thimet) / Sweetpotatoes / Aphids, Thrips, Jassids and Organophosphate Susceptible Two Spotted Mite and Wireworm | 2-Jan-13 | 31-Mar-18 | Growcom | All states (excl. Vic) |
| PER13696 | Chlorothalonil (Bravo 720 SC) / Beetroot, Celeriac, Parsnip, Cucumbers / Various fungal diseases in a range of crops - refer to permit | 16-Apr-14 | 30-Nov-18 | Growcom | All states (excl. Vic) |
| PER13902 | Mancozeb + Metalaxyl / Brassica leafy vegetables, brassicas, chicory, endive, radicchio, rocket, carrot, parsnip / Various fungal diseases | 1-Apr-13 | 31-Mar-18 | Growcom | All states (excl. Vic) |
| PER14043 | Pendimethalin / Spring Onions, Shallots & Radish / Various broadleaf and grass weeds | 1-May-13 | 31-Mar-23 | Growcom | All states (excl. Vic) |
| PER14045 | Phosphorous (phosphonic) acid / Beetroot, Carrot, Parsnip & Brassica leafy vegetables / Damping off and downy mildew | 1-Jul-13 | 30-Jun-17 | Growcom | All states (excl. Vic) |
| PER14048 | Trifloxystrobin (Flint 500 WG) / Beetroot / Alternaria leaf spot and Cercospora leaf spot | 1-Oct-13 | 31-Dec-14 | Growcom | All states (excl. Vic) |
| PER14184 | Difenoconazole (Score Foliar Fungicide) / Beetroot / Leaf spot ( Alternaria spp. & Cercospora spp.) | 16-Dec-13 | 31-Aug-18 | Growcom | All states (excl. Vic) |
| PER14223 | Fluazifop-p-butyl / Various root and allium vegetable crops / Grass weeds, including couch and guinea grass (as listed on product label) | 22-Nov-13 | 31-Dec-16 | Growcom | All states (excl. Vic) |
| PER14245 | Trifluralin 480 / Swede, turnip / Annual grasses & Broadleaf weeds | 10-Mar-14 | 30-Jun-20 | Growcom | All states (excl. Vic) |
| PER14282 | Iprodione (Rovral) / Peppers (capsicum, chillies & paprika) Field & PC and Celeriac (field) / Sclerotinia rot | 1-Jul-14 | 31-Mar-17 | Growcom | All states (excl. Vic) |
| PER14337 | Prometryn (Gesagard) / Taro, Daikon, Galangal, Burdock, Yam, Tumeric, Yam bean / Grass & Broadleaf weeds as per registered label | 10-Mar-14 | 31-Mar-19 | Growcom | All states (excl. Vic) |
| PER14353 | Tebuconazole (Folicur) / Beetroot, beetroot leaves, chicory, endive, radish, silverbeet, spinach / Sclerotinia | 1-Apr-14 | 30-Jun-19 | Growcom | All states (excl. Vic) |
| PER14385 | Propiconazole / Spinach, Beetroot, Celery, Silverbeet, Gai Lum, Chicory, endive & Radicchio / Leaf Spot, Septoria Spot, Early Blight, Powdery Mildew, Rust & Septoria leaf spot | 12-May-14 | 31-Oct-17 | Growcom | All states (excl. Vic) |
| PER14456 | Fluazifop-p-butyl (Fusilade Forte) / Eggplant, Shallots, Spring onions, Leeks, Garlic, Parsnips & Sweetpotato / Various Grass Weeds | 16-Apr-14 | 31-Mar-18 | Growcom | All states (excl. Vic) |
| PER14479 | Clethodim (Select herbicide) / Carrots / Grass weeds, including winter grass | 12-May-14 | 31-Mar-19 | Growcom | All states (excl. Vic) |

| Permit number | Permit description | Date Issued | Expiry Date | Permit holder | States |
|---|---|---|---|---|---|
| PER14484 | Pendimethalin / Parsnip / Grasses and Broadleaf Weeds | 1-Feb-14 | 31-Mar-15 | Growcom | ACT, NSW, Qld, SA, TAS, WA only |
| PER14535 | Oxamyl (Vydate L) / Sweetpotato / Nematodes | 1-Apr-14 | 30-Sep-15 | Growcom | NSW, Qld |
| PER14581 | Chlorpyrifos / Swede turnip, brassica leafy vegetables, silverbeet, spinach, celery, beans, snow peas & sugar snap peas, parsley, sweetpotato / African black beetle, False wireworms, Wireworms, Vegetable weevil | 1-Apr-14 | 31-Mar-19 | Growcom | All states (excl. Vic) |
| PER14582 | Metalaxyl-M (Ridomil Gold 25G) / Parsnips / Pythium Spp. and Phytophthora Spp. | 1-May-14 | 30-Jun-19 | Growcom | All states (excl. Vic) |
| PER14583 | Azoxystrobin (Amistar) / Carrot / Powdery Mildew, Sclerotinia rot/White Mould, (Black rot- suppression only) | 1-Jun-14 | 30-Jun-19 | Growcom | All states (excl. Vic) |
| PER14695 | Fluazifop-p-butyl (Fusilade Forte) / Parsley, coriander, brassica leafy vegetables, chicory, endive, radicchio, spinach, silverbeet, turnip, swede / Annual Grass Weeds | 21-Oct-11 | 30-Jun-16 | Growcom | All states (excl. Vic) |
| PER14816 | Difenoconazole (Score Foliar Fungicide) / Celeriac / Cercospora early blight or leaf spot & Septoria late blight or leaf blight | 28-May-12 | 31-Mar-15 | Growcom | All states (excl. Vic) |
| PER12017 | Methomyl (Lannate L) / Specified - fruiting vegetables (cucurbits), specified - fruiting vegetables (other than cucurbits), specified - Root & tuber vegetables (bulb only), ginger, parsley, rakkyo, shallot, silverbeet, tumeric & celery / Helicoverpa spp., cucumber moth, cluster caterpillar, loopers, webworm, rutherglen bug, thrips including Western flower thrips | 9-Mar-14 | 30-Sep-17 | Growcom | All states (excl. Vic) |
| PER13323 | Petroleum oil / Alliums, brassica vegetables, celery, cucurbits, eggplant, leafy vegetables, lettuce, okra, peppers, snow & sugar snap peas, tomatoes, Rocket, parsley / Specified insect pests | 29-Jun-12 | 30-Nov-17 | Growcom | All states (excl. Vic) |
| **STEM & STALK VEGETABLES** | | | | | |
| PER11686 | S-metolachlor (Dual Gold Herbicide) / Rhubarb / Various weeds | 18-Nov-10 | 31-Aug-15 | Growcom | All states |
| PER11948 | Clethodim (Select herbicide) / Radish / Grass Weeds | 27-Sep-11 | 30-Sep-16 | Growcom | All states |
| PER12221 | Alpha-cypermethrin / Beetroot & Celery / Beetroot - Loopers, vegetable weevil, plague thrips; Celery - Redlegged earth mite, leafroller caterpillar | 20-Jun-12 | 31-May-15 | Growcom | All states (excl. Vic) |
| PER12384 | Emamectin (Proclaim) / Celery (field), Eggplant (field & PC) / Heliothis, Lightbrown apple moth, Cluster caterpillar | 31-Oct-13 | 30-Sep-16 | Growcom | All states (excl. Vic) |
| PER12777 | MCPA 250 / Rhubarb / Broadleaf weeds | 4-Dec-11 | 30-Sep-16 | Growcom | All states |
| PER13035 | Abamectin / Rhubarb / Broad Mite | 11-Oct-13 | 31-Dec-16 | Growcom | All States |
| PER13090 Version 2 | Permethrin (Ambush) / Rhubarb / Green Peach Aphid, Green Looper, Light Brown Apple Moth and Budworms | 11-Apr-12 | 31-Mar-17 | Growcom | All states (excl. Vic) |
| PER13122 | Linuron / Celery / range of weeds | 4-May-12 | 30-Apr-17 | Growcom | All states (excl. Vic) |
| PER13152 | Difenoconazole (Score Foliar Fungicide) / Celery / Cercospora Leaf Spot & Septoria Spots | 29-Nov-12 | 31-Dec-15 | Growcom | All states (excl. Vic) |
| PER13300 | Indoxacarb (Avatar Insecticide) / Celery / Heliothis, Lightbrown apple moth, Lucerne leaf roller and Vegetable weevil | 1-Oct-12 | 30-Sep-14 | Growcom | All states (excl. Vic) |
| PER13441 | trifloxystrobin (Flint 500 WG) / Celery, Silverbeet, Spinach, Chicory and Endive / Various diseases | 1-Nov-12 | 30-Sep-14 | Growcom | All states (excl. Vic) |
| PER13496 | Metalyaxyl-M & Mancozeb (Ridomil Gold MZ WG) / Celery, Silverbeet & Spinach / Late Blight, Septoria Leaf Blight & Downy Mildew | 22-Apr-13 | 30-Sep-16 | Growcom | All states (excl. Vic) |
| PER13627 | Permethrin (Ambush) / Celery / Helicoverpa and Looper | 1-Apr-13 | 31-Mar-23 | Growcom | All states (excl. Vic) |
| PER13654 | Propyzamide (Kerb 500) / Artichoke (Globe) / Selected broadleaf and Grass weeds | 12-Nov-13 | 30-Nov-16 | Growcom | All States |
| PER13658 | Imidacloprid (Confidor) / Rhubarb / Aphids | 31-Oct-13 | 30-Jun-18 | Growcom | All states (excl. Vic) |
| PER13673 | Pymetrozine (Chess Insecticide) / Celery / Aphids | 30-May-14 | 30-Jun-17 | Growcom | All states (excl. Vic) |
| PER14049 | Buprofezin (Applaud) / Celery / Greenhouse whitefly | 9-May-14 | 30-Jun-19 | Growcom | All states (excl. Vic) |
| PER14203 | Propiconazole / Spinach, Beetroot, Celery, Silverbeet, Gai Lum, Chicory, endive & Radicchio / Leaf Spot, Septoria Spot, Early Blight, Powdery Mildew, Rust & Septoria leaf spot | 12-May-14 | 31-Oct-17 | Growcom | All states (excl. Vic) |
| PER14212 | Phosphorous acid / Rhubarb / Downy mildew | 1-Jul-14 | 31-Jan-19 | Growcom | All states (excl. Vic) |
| PER14341 | trifloxystrobin (Flint 500 WG) / Celery, Silverbeet, Spinach, Chicory and Endive / Silverbeet, spinach chicory, endive - Powdery Mildew; celery - Cercospora leaf spot, Septoria leaf spot | 1-Oct-14 | 30-Jun-19 | Growcom | All states (excl. Vic) |

| Permit number | Permit description | Date Issued | Expiry Date | Permit holder | States |
|---|---|---|---|---|---|
| PER14436 | Chlorpyrifos / Swede turnip, brassica leafy vegetables, silverbeet, spinach, celery, beans, snow peas & sugar snap peas, parsley, sweetpotato / African black beetle, False wireworms, Wireworms, Vegetable weevil | 1-Apr-14 | 31-Mar-19 | Growcom | All states (excl. Vic) |
| PER14479 | Clethodim (Select herbicide) / Rhubarb / Grass weeds listed on label | 1-Jul-14 | 30-Jun-19 | Growcom | All states (excl. Vic) |
| PER14493 | Indoxacarb (Avatar Insecticide) / Celery / Heliothis, Lightbrown apple moth, Lucerne leaf roller and Vegetable weevil | 1-Oct-14 | 30-Sep-19 | Growcom | All states (excl. Vic) |
| PER14494 | Esfenvalerate (Sumiguard) / Celery / Helicoverpa armigera | 19-May-06 | 31-Mar-16 | Growcom | Qld |
| PER14583 | Methyl bromide / Fruit & Fruiting Vegetables / Fruit fly control | 19-Oct-09 | 30-Oct-14 | Growcom | Old |
| PER14744 | Dimethoate / Specified Citrus, Tropical Fruit commodities and Hot chilli peppers (post-harvest) / Various Fruit Fly species | 6-Oct-11 | 5-Oct-14 | Growcom | All states (excl. Vic) |
| PER14843 | Dimethoate / Melons including watermelons (post-harvest) / Various Fruit Fly species | 13-Oct-11 | 5-Oct-14 | Growcom | All states |
| PER9161 | Methomyl (Lannate L) / Specified cucurbits, Specified fruiting vegetables, Specified legume vegetables and sweetpotato / Heliothis, cucumber moth and cluster caterpillar | 31-Jul-12 | 30-Sep-17 | Growcom | All states (excl. Vic) |
| **VEGETABLES - GENERAL** | | | | | |
| PER11092 | Methomyl (Lannate L) / Specified cucurbits, Specified fruiting vegetables, Specified legume vegetables and sweetpotato / Heliothis, cucumber moth and cluster caterpillar | 31-Jul-12 | 30-Sep-17 | Growcom | All states (excl. Vic) |
| PER12011 | Fipronil (Regent 200 SC) / Celery & Field grown lettuce (head & leafy) / Celery - Western Flower Thrips, Lettuce - Onion thrips and western Flower Thrips | 25-Mar-14 | 31-Mar-17 | Growcom | All states (excl. Vic) |
| PER12185 | Methomyl (Lannate L) / Specified cucurbits, Specified fruiting vegetables, Specified legume vegetables and sweetpotato / Heliothis, cucumber moth and cluster caterpillar | 31-Jul-12 | 30-Sep-17 | Growcom | All states (excl. Vic) |
| PER12389 | Methomyl (Lannate L) / Specified cucurbits, Specified fruiting vegetables, Specified legume vegetables and sweetpotato / Heliothis, cucumber moth and cluster caterpillar | 31-Jul-12 | 30-Sep-17 | Growcom | All states (excl. Vic) |
| PER13158 | Fipronil (Regent 200 SC) / Celery & Field grown lettuce (head & leafy) / Celery - Western Flower Thrips, Lettuce - Onion thrips and western Flower Thrips | 25-Mar-14 | 31-Mar-17 | Growcom | All states (excl. Vic) |
| PER13170 | Indoxacarb (Avatar Insecticide) / Asparagus / Garden Weevil | 2-Nov-11 | 30-Sep-16 | WA ASA | WA |

# VEGETABLE INVESTMENT SUMMARY

| Year ended 30 June 2014 | Marketing 2013/14 $ | R&D 2013/14 $ | Combined 2013/14 $ |
|---|---|---|---|
| **Funds available 1 July 2013** | | **10,537,582** | **10,537,582** |
| **Income** | | | |
| Levies received | | 7,568,916 | 7,568,916 |
| Commonwealth contributions | | 7,737,164 | 7,737,164 |
| Other income | | 402,044 | 402,044 |
| **Total income** | | **15,708,124** | **15,708,124** |
| *Budget* | | *15,633,857* | *15,633,857* |
| *Variance to Budget* | | *74,267* | *74,267* |
| **Program investment** | | | |
| Levy programs | | 13,783,712 | 13,783,712 |
| Service delivery programs by HAL | | 1,690,617 | 1,690,617 |
| Across industry contribution | | 342,779 | 342,779 |
| Levy collection costs | | 321,006 | 321,006 |
| **Total investment** | | **16,138,114** | **16,138,114** |
| *Budget* | | *18,205,343* | *18,205,343* |
| *Variance to budget* | | *2,067,229* | *2,067,229* |
| Annual surplus/deficit | | -429,990 | -429,990 |
| **Closing balance 30 June 2014** | | **10,107,592** | **10,107,592** |

## Vegetable Industry Advisory Committee (IAC)

Jeff McSpedden (Chair)
Peter Ward (Deputy Chair)
John Brent
Dr Kevin Clayton-Greene
Danny De Ieso
Denise Ellement
Robert Hinrichsen
John Said
Eoin Wallis (Independent Officer)
Richard Mulcahy (Ex-Officio)
Will Gordon (Ex-Officio)

## For more information contact:

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**E will.gordon@horticulture.com.au**

**Industry structures and systems governing the imposition of and disbursement of marketing and research and development (R&D) levies in the agricultural sector**

9.00am Wednesday 4 February 2015

Attendees: Richard Mulcahy, Andrew White, Jeff McSpedden

**Committee members scheduled to attend:** Senator Glenn Sterle – Chair (Labor), Senator the Hon Bill Heffernan – Deputy Chair (Liberal), Senator Joe Bullock (Labor), Senator Chris Back (Liberal), Senator David Leyonhjelm (Liberal Democrat), Senator Linda Reynolds (Liberal), Senator Rachel Siewert (Greens)

On 2 September 2014, the Senate moved that the following matters be referred to the Rural and Regional Affairs and Transport References Committee for inquiry and report by 24 November 2014.

The industry structures and systems governing the imposition of and disbursement of marketing and research and development (R&D) levies in the agricultural sector, with particular reference to:

a. an audit of reports, inquiries and reviews relevant to this inquiry;
b. the basis on which levies are imposed, collected and used;
c. competing pressures for finite R&D funds;
d. the opportunities levy payers have to influence the investment of the levies;
e. the opportunities levy payers have to approve and reapprove the imposition of levies;
f. the transformation of R&D and marketing into increased returns at the farm gate, including the effectiveness of extension systems;
g. collaboration on research to benefit multiple industry and research sectors;
h. industry governance arrangements, consultation and reporting frameworks; and
i. any other related matter.

Words: 871

My name is Richard Mulcahy and I am the CEO of AUSVEG. With me is my colleague Andrew White who is the Deputy CEO of AUSVEG, as well as Jeff McSpedden who is a grower and former Chair of the Vegetable Industry Advisory Committee that previously provided guidance on Research & Development expenditure and projects.

AUSVEG is the National Peak Industry Body representing the interests of approximately 9,000 Australian vegetable and potato growers which pay the National Vegetable and Potato Levies. We thank you for providing us the opportunity to address the matter of *Industry structures and systems*

*governing the imposition of and disbursement of marketing and research and development (R&D) levies in the agricultural sector* to the Rural and Regional Affairs and Transport References Committee.

The use of levy funding to contribute to projects that would otherwise not receive the required attention or investment is a major factor in the continued health of our agricultural R&D sector. The R&D projects funded through this system provide very real and significant returns, not just at the farm-gate but across the industry as a whole.

The disbursement of the vegetable and potato levies is subject to strict governance arrangements which ensure accountability and transparency. Milestone and final reports are made available by service providers to growers and the industry, and the corporate governance of administrative bodies has required minutes and recording of decisions and actions to be taken at the meetings of industry committees. The RDC for the horticulture sector is currently transitioning from a Member-owned company (Horticulture Australia Limited - HAL) to a grower-owned company (Horticulture Innovation Australia - HIA). A new advisory mechanism is yet to be formally tabled, however, under the previous HAL structure, vegetable and potato levy payers have had numerous avenues through which they can influence the investment of the levies, including by attending regular levy payer meetings or serving on industry advisory committees.

AUSVEG has worked closely with HAL/HIA to facilitate the generation of R&D ideas, by involving growers in the investment process and leveraging their knowledge together with that of other industry experts.

HIA distributes the funds from the National Vegetable Levy and the levies on fresh and processed potatoes, together with matched funding from the Australian Government. In the case of the vegetable and potato industries, funds can only be collected and disbursed for the purposes of R&D.

The benefit of this broad R&D investment into matters affecting an entire industry greatly outweighs the private benefit of any one party achieving beneficial research results and restricting the impact of those results. Just a few of the critical investments that have occurred as a result of the R&D co-investment process include: greater access to vital crop protection products; export development and capacity building activities to increase exports of Australian vegetables; soil health and productivity solutions; mechanisation to decrease the industry's reliance on labour; energy efficiency audits to decrease costs and the impact on the environment; and innovative soil DNA testing for potato diseases.

Both the Australian vegetable industry and the Australian fresh and processed potato industries have strategic investment plans which were designed to guide the investment of R&D funds into these areas.

Through a competitive tender process facilitated by HAL/HIA, costs for R&D projects are kept to competitive levels and scrutiny is able to be applied directly by growers and industry experts. Funds are directed to

projects which are relevant to the industry's interests and its long-term goals. Design Teams comprising growers and industry experts have contributed significantly to ensuring that funds are directed to the areas in which the industry stands to benefit most from R&D.

However, proposals for regular plebiscites using a registry of levy payers, while a good idea in theory, are simply not practical. AUSVEG represents approximately 9000 growers and around 150 different vegetable commodities. The fluid nature of horticultural farming means that while a grower may be producing leviable vegetables one year, they may rotate to a non-leviable crop the next year. Any list produced has the potential to become redundant within a single voting cycle. Furthermore, the Federal Government Department of Agriculture does not know who the levy payers actually are as no definitive list exists due to the way the levy is collected at the first point of sale.

While we have historically supported, and continue to support, a democratic and open process for levy imposition and investment, the time and resources required to administer regular plebiscites would be onerous, expensive and unlikely to receive high voter turnout from growers. Given the government doesn't have a definitive list of levy payers the results would also be difficult to validate or verify.

AUSVEG is satisfied that the majority of National Vegetable Levy payers and Fresh and Processed Potato Levy payers support the continuation of national levies, and have access to forums through which they can provide critical input regarding their future investment.

Noting the current transition from Horticulture Australia to Horticulture Innovation Australia, AUSVEG strongly believes that the current system of levy investment, with growers directly represented through industry advisory mechanisms (previously called IACs and Design Teams), and indirectly represented through AUSVEG and HIA, has produced outcomes which validate both the need to fund projects that benefit the industry as a whole, and the need for growers to have a voice at the table as representatives on these committees.

# SUPERFINE WOOL INDUSTRY STRATEGIC REVIEW

by

John Powell
Optimal ICM

for

Australian Wool Innovation Limited
and
Australian Superfine Wool Growers' Association Inc.

30 January 2013

## About the author

John Powell has been a superfine wool grower for 25 years at his property 'Woodvale' near Yass in southern New South Wales. John is currently Secretary of Goulburn-Yass Branch of ASWGA, and is an Owner-Classer. He has a BSc in Applied Science (Major in Natural Resources Management, sub-major in Economics). John has had a 30-year professional career (the last 12 years as an independent consultant) managing landcare programs and sustainable landscapes Research Development and Extension.

# Contents

**Acknowledgements**

The author gratefully acknowledges financial support provided by AWI, and guidance and input received from the project Working Group, particularly Helen Cathles, President of ASWGA. The time and effort that participants in the Cost of Production work put into contributing detailed financial information is greatly appreciated.

# SUPERFINE WOOL INDUSTRY STRATEGIC REVIEW

## Executive Summary

This review arose from concerns within the membership of the Australian Superfine Wool Growers' Association Inc. (ASWGA) that because their wools are undervalued and market prices are unviable, there is little incentive for them to continue working in a complex, high-risk, and costly business.

Many growers, including those who had generations of passion, skill and experience in producing the world's highest quality superfine merino wool, have left the industry. Following representations from ASWGA, Australian Wool Innovation Limited (AWI) funded this Review to examine the current situation facing the industry and develop strategies to secure a viable future.

In totality, the Australian superfine wool industry comprises all wool 18.5 microns and finer, from well-bred and well-classed merino clips, from poorly-bred and poorly classed merino clips, and from other breeds similar to merinos including South African Meat Merinos (SAMMs) and Dohnes. However, consistent with its origins, **this Review focuses on securing a viable future for high quality and well-classed superfine merino wool (including ultrafine merino)**.

This review: describes superfine merino wool growing business strategies; defines the types and styles of wool they produce; analyses their current situation and operating environment; examines findings from past initiatives aimed at improving viability; synthesises issues into a clear problem statement; confirms the underlying issue causing the problem; articulates goals for industry sectors and stakeholders; spells out core strategies, researchable questions and possible actions for further discussion; draws conclusions and recommends that funding support be provided for printing of this report and wider consultation.

### *Superfine merino wool*

The superfine merino wool industry is characterised by growers adopting three main business strategies. **Ultrafine Merino** businesses produce 15.5 micron and finer wools, visually 80's count and up, all true-to-type Saxon. **Traditional Superfine Merino** businesses produce 15.6 to 18.5 micron wools, visually 74's count and up, mostly true-to-type Saxon. **Bold Superfine Merino** businesses produce 15.6 to 18.5 micron wools, mostly visually 70's count and below.

Following testing and prior to sale, wools from these businesses are typed by appraisers as **AS** (Traditional), **M** (Merino) and **M** (Bold) (Bold crimping merino). **The three merino wool types do not correlate directly with the three main business strategies.** For example a Traditional Superfine Merino business could be producing lines of both AS and M types.

Wools typed as AS must be true-to-type Saxon. Wools typed as M are, in the main, slightly bolder than true-to-type Saxon. Wools typed as M (Bold) have a distinctively bold crimp and a significantly lower quality count than expected for their micron. Except for Dohnes, wools from non-merino breeds cannot be typed as M or M (Bold).

Taking account of other attributes, appraisers also give wools offered for sale a style number, ranging from 1 (Choice) to 6 (average topmaker). **M** and **M**(Bold) wools can be given only styles 3 (spinners) to 6 (average topmaker).

### *Current situation*

Almost 100% of superfine merino wool growing businesses are family owned and managed. Very few superfine merino wool growing properties are running over 20,000 sheep, with the majority of properties running less than 10,000.

At a volume of almost 88 Mkg, production of superfine wool (all breeds) peaked in 2006 in the middle of Australia's record 10-year drought. A large proportion of this wool was probably poor quality 'hunger fine' wool from genetically fine wool sheep, not high quality wool from genetically superfine sheep. Although more favourable wool growing conditions have prevailed from 2009-10

to 2011-12, many superfine merino growers were still rebuilding their flocks and renovating pastures. They may also be 'catching up' on post-drought investment in farm infrastructure.

In 2011-12, total superfine wool production was almost 70 Mkg. This is double the 34 Mkg produced a decade ago. Superfine wool now comprises about 20% of the total Australian wool clip. Data that separates production of superfine merino wool from production of superfine wool from SAMMS, Dohnes etc is not available.

### *Production costs*

Indicative production costs suggest that with the wool prices and favourable seasonal conditions that prevailed in 2011-12; Ultrafine Merino businesses based on shedded wethers or paddock-run self-replacing flocks **do not break even on production costs**, let alone achieve commercial viability; Traditional Superfine Merino and Bold Superfine Merino businesses operating self-replacing flocks **may break even on production costs but are not commercially viable**; Bold Superfine Merino wether businesses **may break even on production costs, and have the potential to generate a surplus over production costs, but the surplus is probably insufficient** to achieve commercial viability.

### *Product marketing and promotion*

AWI is currently undertaking marketing programs to increase awareness amongst brands, designers and consumers about the desirable qualities of fine and superfine wool (all breeds). These include: *Merino: No Finer Feeling*; *Campaign for Wool*; *China Luxury Market*; and *Mothers and Babies*. AWI also supports the following off-farm research programs to inform supply chains about the attributes of superfine merino wool: *The Wool Lab*; and *Superfine Merino Knits*. AWI also produces a monthly Market Intelligence report that includes superfine wool coverage.

These initiatives appear to have rekindled interest in superfine wool apparel as a whole. However, identifying the actual impact that they may have had on demand and prices for high quality superfine merino wool, or what would have happened to demand and prices without them, has been beyond resources available for this Review.

### *Learning from the past and tips from the present*

Several recurring themes emerged from an analysis of reports and initiatives over the last 30 years concerning the superfine wool industry, including: lack of viability; growers leaving the industry or changing enterprises; challenges in describing and measuring the special characteristics of superfine merino wool; educating supply chains about the characteristics; and demonstrating the value of the characteristics to supply chains.

These themes indicate among other things that: the superfine/ultrafine merino industry will continue to be a difficult business; demand can be improved by strategic product innovation and targeted product marketing; selecting countries in which to conduct pilot programs and product marketing campaigns is important; and targeted marketing must incorporate an easy way (such as certification for next-to-skin comfort) for consumers to differentiate between superior and inferior superfine wool products.

A recent overseas visit by ASWGA representatives drew the following suggestion from overseas processing interests: '*We [currently] have a measurement chart to sell greasy wool [to processors] that articulates the attributes of raw wool based on scientific analysis.* ***We need [to develop] an attributes chart, established through scientific trial and drawn from the consumers' language, that articulates the attributes for each [of the three] wool types. Thus establishing the value at the only place willing to reward [special] attributes – the retail consumer.'***

### *Problem statement*

The problem statement can be described as a **downward spiral** in which higher meat prices and low wool prices result in superfine wool growing businesses increasing emphasis on growth rates and carcase weights at the expense of wool quality; clip preparation standards fall; other businesses turn to more viable enterprises; our major customer appears to buy predominantly on measurements, with supply chains for it and other customers not valuing wool attributes currently assessable only by visual inspection; there is no simple mechanism whereby consumers can recognise quality and to relay their preferences back through supply chains; the price setting mechanism has changed from a market that pays higher premiums as quality rises to a market that applies bigger discounts for increasing variation down from perfection; premiums for choice, superior and spinners styles over best topmakers and good topmakers decline; global demand in general remains weak; more growers lose heart and leave the industry; and in succession planning, potential new entrants pursue more rewarding pursuits.

The key underlying issue causing the problem for high quality superfine merino wool is that there is **limited consumer appreciation of the benefits for them of products made from high quality superfine merino wool, which leads to a lack of consumer desire for products made from it, and hence lack of consumer willingness to pay higher prices for those products.** In the case of ultrafine merino wool produced from shedded sheep, the market was underpinned by limited competition, and when some of the buyers left the industry, the price collapsed.

These issues are not new. Low prices, lack of supply chain appreciation for and valuing of superfine merino's special characteristics, and growers leaving the industry have been recurring themes for several decades.

### *Future operating environment*

In examining the future operating environment, presentations made by AWI representatives during Wool Poll 2012 suggest that **global economics, demographics and markets are becoming more favourable for wool**.

Supply of superfine wool (all breeds) is expected to remain tight, but superfine wool represents only a small fraction of apparel fibre. A watching brief must be maintained on global production of superfine wool and similar prestige fibres and the implications for Australian growers. It is unlikely that the superior position of cashmere over ultrafine merino will change without a separate targeted marketing campaign for ultrafine wool.

The emergence of China and other BRIC countries (Brazil, Russia, and India) as affluent consumer markets will underpin 40-70% growth in clothing expenditure. In Australia's traditional wool markets, especially the UK, France, Germany, Italy and Japan, over 50 year olds will dominate and this cohort will have more than 50% of their countries disposable income. New product categories will be critical, for example infants/maternity, urban, and below the waist casual for men and women.

In the future production environment in Australia, c**limatic constraints and native vegetation protection legislation in some States will limit the extent to which growers can reach viability by increasing productivity**. Growers are also facing calls from domestic and overseas consumers of wool and sheep meat products that the products be produced only in accordance with consumer expectations of acceptable animal welfare practices. Costs associated with meeting consumer expectations, as well as the usual production costs, will continue to increase.

### *The way forward*

The way forward is to: confirm the key underlying issue; acknowledge constraints to productivity increases; focus on achieving wool price increases; take advantage of favourable global economic developments; describe what success would look like; set out **core strategies** to achieve success; and list researchable questions to generate the knowledge to implement the strategies.

**Core strategies** are to:

- Implement a ***Campaign for Superfine Merino***, including re-branding and re-launching ultrafine merino. The Campaign should rebuild the prestige and markets surrounding **1PP** and **AS** types – the 'flagships' of the ultrafine/superfine merino industry
- Ensure the *Campaign's* product innovation and product marketing activities focus on assisting consumers to differentiate between products made from high and low quality ultrafine and superfine merino wools, encouraging them to lift their desire and demand for the former and to relay their preferences back through supply chains to wool buyers
- Monitor and evaluate the *Campaign* to ensure that it is delivering increased prices to growers of Australian ultrafine and superfine merino wool. Re-direct and adapt the *Campaign* accordingly
- Improve the way we technically specify and describe the attributes of ultrafine and superfine wools throughout supply chains (from the *Code of Practice* at shearing to swing tags in retail stores) – curvature R&D and reliable tests have an important role
- Ensure technical specifications clearly differentiate between **AS**, **M** and **M** (Bold) superfine merino wools, the differences between 1PP and Styles 1-6 of these wools, as well as the differences between these merino wools and wools from SAMMs and Dohnes
- Understand how these technically different wools process, identify what the processing advantages are for each, and how they can be made into new and innovative products
- Use this understanding of technical and processing differences to add value and engage each stage of supply chains to get uptake
- Ensure wool testing and market reporting arrangements provide detailed information on the profile of the Australian superfine wool clip, particularly for microns, volumes and prices for the main types and styles.

In parallel with the above strategies, AWI and ASWGA should work together on a collaborative and collegiate basis to:

- Enhance grower and processor knowledge of and commitment to high quality superfine merino wool through effective communication and engagement during implementation of the core strategies
- Ensure that AWI programs are more effective in increasing demand and prices for superfine and ultrafine wool, and that there is transparent attribution of the program's results
- Improve availability of independent market intelligence to growers, including predictions of global trends in demand and likely prices, and the factors affecting those trends, within and across selling seasons
- Enhance growers' business management skills to ensure they can access necessary financial arrangements.

***Conclusions and recommendation***

Despite a favourable global outlook, the superfine wool industry should expect similar challenges as in the past, viz volatile global economic conditions, markets that don't sufficiently recognise and value the special characteristics of high quality superfine/ultrafine wools, and competition from alternative fibres, including poorer quality superfine wools.

There is scope for improvement in Australia's investment in product innovation and targeted product marketing and promotion in relation to superfine wool. There should be **enhanced focus on assisting consumers to differentiate between products made from high and low quality superfine wools, encouraging them to lift their desire and demand for the former, and to relay their preferences back through supply chains to superfine wool buyers.** This focus is especially applicable to high-income consumers who are likely to be price inelastic (they buy what they desire irrespective of price), and hence largely unaffected by the strong $A.

**It is essential to monitor the extent to which improved product innovation and marketing does result in improved prices to growers, and to re-direct and adapt the programs accordingly.** It is also critically important to maintain continuity in not only promoting and marketing high quality superfine merino wools as the world's best fibres, but also in researching methods and techniques to prove that they are, and in doing so, demonstrate their value at each step in supply chains.

Improved market intelligence, coupled with responsive, well-funded and well-targeted product promotion, marketing and research, may deliver an increasing price trend over time. In addition, growers could achieve greater increases in prices received over time (ie beat the trend) by selling during price highs and holding during price lows. To do this, they need access to accurate market intelligence that includes predictions of global market trends affecting demand and prices within and across selling seasons. They also need access to training to learn the necessary business skills and build or source the financial capacity to hold wool for long periods if necessary.

**The emphasis of strategies and actions arising from this Review must be on increasing prices received and improving growers' business management skills.**

Finally, this Review recommends that AWI should provide funding for and ASWGA should provide support for printing and wider circulation of this report, and consultation with industry stakeholders identified in the Attachments. **Should that consultation endorse the core strategies listed in this report, or variations of them, it is recommended that AWI provide funding to reconfigure them as a Strategic Plan, and to implement that Plan**.

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# 1. Background

## 1.1 Origins of this Review

This review arose from concerns within the membership of the Australian Superfine Wool Growers' Association Inc. (ASWGA) that because their wools are undervalued and market prices are unviable, there is little incentive for them to continue working in a complex, high-risk, and costly business.

Many growers, including those who had generations of passion, skill and experience in producing the world's highest quality superfine merino wool, have left the industry. The big superfine merino wool clips that used to come from Tasmania are now gone. At the elite ultrafine end, only a handful of growers are left.

ASWGA is concerned that as a whole, the high quality end of the superfine merino wool industry is contracting and trending towards a lesser quality product, produced down to a price. This situation is damaging Australia's reputation as the world's largest supplier of high quality superfine merino

wool, and is exposing our superfine merino wool industry to further substitution from other fibres and increased competition from other superfine merino wool growing countries.

As the peak body representing growers and processors of superfine merino wool, ASWGA is determined to secure a viable future for growers and processors of quality superfine merino wool, by developing and implementing a strategic plan.

Following representations to Australian Wool Innovation Limited (AWI), AWI agreed to provide funding for a small consultancy to review the current situation and the future operating environment facing the superfine merino wool industry, and develop strategies to secure a viable industry future.

### 1.2 Working Group

This report has been authored by John Powell, Optimal ICM, under direction from an expert Working Group comprising:

- Dr Paul Swan, Group Manager, Market Intelligence and Reporting, Australian Wool Innovation Limited
- Helen Cathles, President, Australian Superfine Wool Growers' Association Inc
- Trevor Mibus, Vice President, Australian Superfine Wool Growers' Association Inc
- Andrew Blanch, Managing Director, New England Wools
- Philip Attard, 'Gostwyck', New England

Other people consulted during this Review are listed in Attachment 1.

This Review:

- Describes superfine merino wool growing businesses and the wool types they produce
- Analyses their current situation and future operating environment
- Examines findings from past and present initiatives aimed at increasing the viability of superfine merino wool growers
- Synthesises current issues into a clear problem statement
- Confirms the underlying issue causing the problem
- Articulates goals for industry sectors and stakeholders
- Spells out core strategies, researchable questions, and possible actions that could be discussed further with industry stakeholders
- Draws conclusions and recommends that funding support be provided for wider consultation.

### 1.3 Intended audience

The immediate audience for this Review report is ASWGA Council and AWI. These organisations will determine the extent to which the report may be more widely circulated.

## 2. Australian Superfine Merino Wool

In totality, the Australian **superfine wool industry** comprises all wool 18.5 microns and finer, from sheep breeds including Merino, South African Meat Merinos (SAMMs), Dohnes etc. However, consistent with its origins, this review concentrates on **high quality and well-classed superfine merino wool (including ultrafine merino)** 18.5 microns and finer.

## 2.1 Organisations representing superfine merino wool

There are two industry organisations representing Australian superfine merino wool growers.

ASWGA was founded 42 years ago to represent the superfine merino industry to the wool industry generally and to governments, and to foster good working relationships with overseas mills processing superfine merino wool. ASWGA has 18 mill members throughout Italy who were inaugural members 40 years ago. Mills in Turkey, United Kingdom, China and Japan are also members. ASWGA has peak body status with the Australian Government.

ASWGA grower membership is divided into seven regions, with grower members in all States. Growers applying to join ASWGA are assessed and if accepted as members, they must use high quality breeding, classing and clip preparation techniques. Members can use the ASWGA 'Rams Head' brand on bales and in sales documentation as a symbol assuring wool quality, animal welfare and environmentally sustainable production. ASWGA's constituency comprises growers producing **AS**, **M** and **M** (Bold) superfine merino wools (see section 2.3 below) in accordance with ASWGA's standards.

AUSFINE (TM) was established 10 years ago to provide a readily identifiable market brand for the traditional 'Saxon type' superfine wool industry and to provide a base for education programs specifically designed for superfine wool growers, classers and shed staff. AUSFINE (TM) members undertake to supply mills with traditional 'Saxon type' (**AS)** wools that have implied quality guarantees. The unique AUSFINE (TM) bale branding and description system applies across all superfine wool growing districts on similar wool types to give mills and buyers extra confidence with the consistent quality of delivery (Anon 2002).

Some growers of high quality superfine merino wool are members of both ASWGA and AUSFINE (TM).

## 2.2 Business strategies

In response to higher sheep meat prices and lower wool prices, superfine wool growers have shifted their genetics away from traditional 'Saxon' type merinos producing fine crimping 'true to type' ultrafine and superfine wool, towards larger-bodied, heavier-cutting merinos producing 'bold crimp for micron' superfine wool.

As a result, there is now considerable variation in the crimp frequency and staple length of superfine merino fleece wools of the same micron with the same 12 month's growth. For example, at one end of the continuum, 16.5 micron fleece wools can be 100's visually, with 75mm staple length, while at the other end of the continuum, 16.5 micron fleece wools can be 66's visually, with a 140 mm staple length.

The extremes in crimp frequencies and staple lengths, and the range of frequencies and lengths in between, reflect the different **business strategies** adopted by growers in an attempt to maintain viability. For the purposes of this report, and in particular to assist analysis of production costs, the business strategies have been grouped as follows:

- **Ultrafine Merino** 15.5 and finer, visually 80's and up, **all** true to type Saxon. A very high cost business strategy characterised by all or most of the following: shed construction, sheep coats, wether sheep purchases, substantial feed costs, high labour costs, very substantial clip preparation costs (to ultrafine wool classing standard, eg sides only in top lines)

- **Traditional Superfine Merino** 15.6 to 18.5, visually 74s and up, **mostly** true-to type Saxon. A high cost business strategy characterised by all or most of the following: sheep coats, high cost genetics, routine supplementary feeding, routine fertiliser spreading, high labour costs, high clip preparation costs (classed to the AWEX premium classing standard, eg segmenting within pieces and bellies as well as within fleece (backs, necks out)
- **Bold Superfine Merino** 15.6 to 18.5, **mostly** visually 70s and below. A relatively high cost business strategy characterised by all or most of the following: similar cost categories as above for Traditional Superfine Merino, but usually lower costs within those categories, and can be classed according to either the AWEX premium classing standard or the AWEX Merino classing standard.

## 2.3 Classing and appraisal

Table 1 below shows AWEX *Code of Practice 2013-15* style descriptions for superfine merino, to guide wool classers as they prepare lines of wool during shearing. The descriptions of premium quality superfine merino wools (particularly styles 1-3), also inform growers of standards their clip needs to meet to achieve excellence in superfine wool production.

### *Styles*

In the table, style is a collective term used to describe a range of characteristics. The descriptions are general in nature with different weighting applied to each characteristic. Wool buyers and their processors will use their own style recipes (AWEX 2012[(a)]).

| Style | Name | Description |
|---|---|---|
| 1 | Choice | High yielding, dense, high staple strength (relative to micron), low mid breaks, high uniformity in length and strength, excellent crimp uniformity, character and definition, excellent colour (very white), true to type, no faults, well skirted and classed, vegetable matter content must not exceed 1.5%. **Note**: less than 0.1% of all Superfine/Ultrafine wool falls into this style grade. |
| 2 | Best spinners | High yielding, dense, high staple strength, low mid breaks, high uniformity in length and strength, excellent crimp uniformity, character and definition, excellent colour (very white), true to type, well skirted and classed, vegetable matter content must not exceed 1.5% |
| 3 | Spinners | High yielding, high staple strength though some part tender acceptable provided not high in mid breaks, uniform length, uniform crimp, very good colour, must be skirted and classed. |
| 4 | Best | Generally high yielding, lower staple strengths accepted, higher mid break readings accepted, less regular in length, less regular in crimp presentation, good/fair colour |
| 5, 6 | Good (5) Average (6) | Generally good to average yielding, all staple strengths and mid break readings accepted, less regular in length, less regular in crimp presentation, good/fair colour. |

AWEX also produces Appraisal Guidelines and an **AS** Style Guide Table to provide additional guidance for brokers, appraisers and auditors in making appraisal decisions after wool has been classed and tested and prior to sale. The Style Guide Table is a general guide to style definition. One characteristic in isolation will not define the applied style. An appraiser/auditor may elect to overrule one or more specifications due to placing higher priority on other characteristics (AWEX 2012[(b)])

### *Types*

From the beginning of 2013, fleece wools produced by the three business strategies, with the exception of 1PP wools [(a)], are appraised prior to sale as one of the following **types** (AWEX 2012[(a)]), along with an assessment of style.

- **AS** - Traditional true to type, Saxon style, 74s count or higher, styles 1-6
- **M** - Merino 18.5 micron and finer not displaying true-to-type Saxon style appearance, slightly bolder. May show the influence of visually broader crimp, styles 3-6
- **M** (Bold) – Bold crimping merino 18.5 micron and finer displaying a distinctively bold (prominent) and significantly lower quality count (ie stronger) than the expected mean fibre diameter, styles 3-6.

Except for Dohnes, wools from non-merino breeds cannot be typed as M or M (Bold). The three merino wool types do not correlate directly with the three main business strategies described in section 2.2. For example, a Traditional Superfine Merino business could be producing lines of both AS and M types.

*[(a)] 1PP (Perfect Plus) wools must be of AST style 1 (Choice), 16.9 micron and finer, 90s/100s count visually, and containing 1% vegetable matter or less, at least 70mm in length unless wool is significantly finer (eg 15.0 micron), where a slightly shorter length will be accepted. These wools must exhibit superlative quality, style and soundness and be prepared in the best possible manner (AWEX 2012[(c)]). Quality being defined as fit for purpose.*

## 2.4 Does appraisal add value?

Appraisal of sale lots in accordance with AWEX Appraisal Guidelines and the **AS** Style Guide Table is the first opportunity in the sale process for a qualified professional to certify the extent to which wools on offer meet the standards that distinguish premium superfine merino wools from lesser quality merino wools of similar micron.

In the past, in traditional markets, there was an effective feedback loop concerning product quality from consumers back through supply chains to buyers. This meant that buyers' limits were raised for wools from well-grown and well-classed clips that were appraised accordingly. Buyers recognised this value to supply chains and prices to growers were maximised.

Today, the information from classing, testing and appraisal that accompanies superfine merino wool throughout supply chains to consumers is largely limited to micron measurement. The high quality styles that passionate growers and classers strive to achieve, and the appraisal that confirms the high standards have been achieved, are lost.

**The price setting mechanism has changed from a market paying higher premiums as quality rises to a market that applies bigger discounts for increasing variation down from perfection.** For a natural product produced in a highly variable climate like Australian superfine merino wool, perfection is never achievable.

The end result is that premiums for style have declined to such an extent that there is now virtually no premium for 1PP wools, with these selling for as low as 1300 cents/kg greasy in 2012 (Cathles Pers. Comm.).

# 3. Current situation

## 3.1 Superfine merino wool production

Almost 100% of superfine merino wool growing businesses are family owned and managed. Very few businesses are running over 20,000 sheep, with the majority running less than 10,000 (Cathles Pers. Comm.).

At a volume of almost 88 Mkg, production of superfine wool (all breeds) peaked in 2006 in the middle of Australia's record 10-year drought. A large proportion of this wool was probably poor quality 'hunger fine' wool from genetically fine-wool sheep, not high quality wool from genetically superfine sheep.

The record drought had (and continues to have) serious impacts on most superfine merino wool growers. Growers reduced stocking rates significantly. Supplementary feed costs increased, while superfine merino fleece wool prices halved, down from 1,600 c/kg greasy in 2002 to 800 c/kg greasy in 2004 (Powell, 2011).

Although more favourable wool growing conditions have prevailed from 2009-10 to 2011-12, many superfine merino growers were still rebuilding their flock and renovating their pastures in early 2013. They may also be 'catching up' on post-drought investment in farm infrastructure. Hence their current production costs (see section 3.3 below) may still reflect the legacy of the drought.

Investment in drought recovery is expensive and is limited by income received by growers post-drought or from off-farm investments or employment. Recovery can take many years and can be further delayed if drought returns after only a short respite.

Individual growers can be seriously impacted financially and emotionally by multiple events. For example, bushfires destroyed thousands of high quality superfine merinos and burnt almost 14,000 ha of pasture near Yass in southern New South Wales in early 2013. Floods and disease outbreaks are additional risks faced by superfine wool growers.

In 2011-12, total superfine wool production was almost 70 Mkg. This is double the 34 Mkg produced a decade ago. Superfine wool now comprises about 20% of the total Australian wool clip.

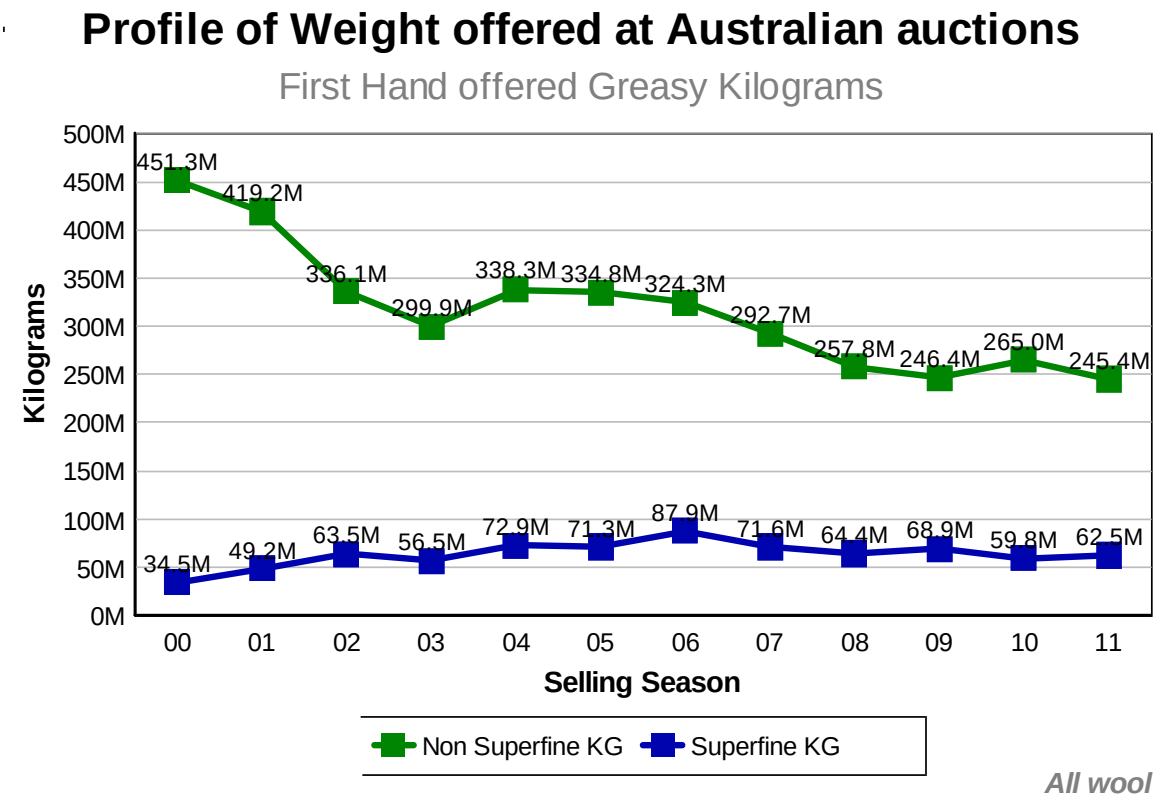
Data that separates production of superfine merino wool from production of superfine wool from SAMMS, Dohnes etc is not available. Nor is data on the volume of sales of the three main types of superfine merino wool, viz AS, M and M (Bold).

**The absence of relevant production data is an impediment to understanding the clip profile of the superfine merino industry, how the various wool types are used throughout supply chains to make different products, and how targeted product marketing programs can be developed that showcase merits of the different types and hence improve type-specific demand and prices.**

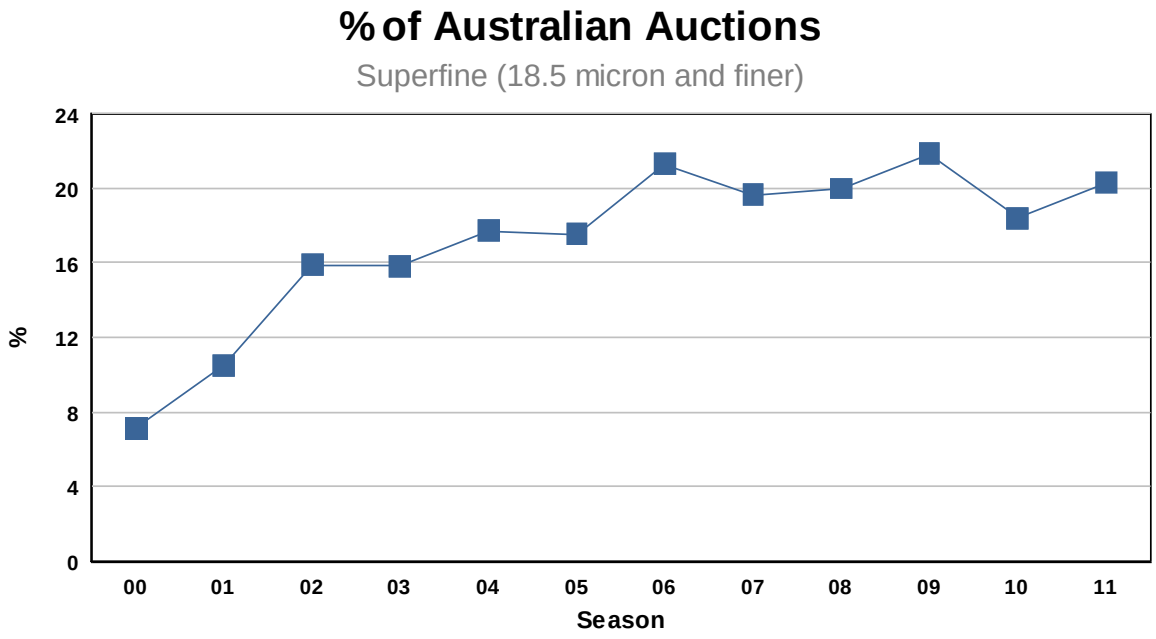
**In establishing procedures to collect and analyse production data for superfine merino wool, it is important for accuracy and international supply perception that weights are used and not percentages.**

## 3.2 Superfine wool sales (all breeds)

The graphs below show sales data for superfine wool from all breeds from 2001 to 2011 (Cother, Pers. Comm.).




*All wool*



**Wool offered at Australian Auction by Selling Season (greasy kilograms)**
**Australian Wool Exchange Ltd**

| Season | KG Total | KG Non Superfine | KG Superfine | % Superfine |
|---|---|---|---|---|
| 00 | 485.7 mkg | 451.3 mkg | 34.5 mkg | 7.1 % |
| 01 | 468.3 mkg | 419.2 mkg | 49.2 mkg | 10.5 % |
| 02 | 399.6 mkg | 336.1 mkg | 63.5 mkg | 15.9 % |
| 03 | 356.4 mkg | 299.9 mkg | 56.5 mkg | 15.8 % |
| 04 | 411.2 mkg | 338.3 mkg | 72.9 mkg | 17.7 % |
| 05 | 406.1 mkg | 334.8 mkg | 71.3 mkg | 17.6 % |
| 06 | 412.1 mkg | 324.3 mkg | 87.9 mkg | 21.3 % |
| 07 | 364.2 mkg | 292.7 mkg | 71.6 mkg | 19.7 % |
| 08 | 322.2 mkg | 257.8 mkg | 64.4 mkg | 20.0 % |
| 09 | 315.3 mkg | 246.4 mkg | 68.9 mkg | 21.9 % |
| 10 | 324.8 mkg | 265.0 mkg | 59.8 mkg | 18.4 % |
| 11 | 307.9 mkg | 245.4 mkg | 62.5 mkg | 20.3 % |

## 3.3 Production costs

A small sample of ASWGA members was contacted as part of this Review, to participate in an exercise estimating the cost of production per greasy kg (total wool clip including oddments) for the each of the three business strategies described in section 2.2 above.

Participants completed Excel spreadsheets with cells covering income, variable costs including owner-operator labour, and overhead costs attributable to their ultrafine and superfine wool businesses.

**The figures provide only an indicative estimate of the cost of production per greasy kilogram for each business strategy. They do NOT provide the price per greasy kilogram required for commercial viability.**

Commercially viable wool prices would need to cover not only production costs, but in conjunction with any increase in business asset value, would need to generate a surplus over production costs equivalent to or better than returns available from alternative investments.

Participants' individual spreadsheets were analysed by the author of this Review report and will remain confidential. Indicative estimates are:

- Ultrafine Merino shedded wethers > $120/greasy kg
- Ultrafine Merino self-replacing flock > $30/greasy kg [(a)]
- Traditional Superfine Merino self-replacing flock $10-15/greasy kg
- Bold Superfine Merino wether**s** $ 9-16/greasy kg

*(a) Author's estimate, due to non-availability of actual data*

The above figures have been based on data from 2010 to 2012. In these years, seasonal conditions for wool growing were about **'as good as it gets'** across much of southern Australia. **Wool cuts per head and per hectare were good to excellent**, and supplementary feeding was minimal. In the author's opinion, the figures suggest that with seasonal conditions and prices prevailing in those years:

- Ultrafine Merino businesses based on shedded wethers or paddock-run self-replacing flocks do not break even on production costs, let alone achieve commercial viability
- Traditional Superfine Merino and Bold Superfine Merino businesses operating self-replacing flocks may break even on production costs but are not commercially viable

- Bold Superfine Merino wether businesses may break even on production costs, and have the potential to generate a surplus over production costs, but the surplus is probably insufficient to achieve commercial viability
- Most superfine merino growers and their families are paying a high price for the passion and emotional commitment which they and their families employ in producing the highest quality raw fibre
- Producing high quality ultrafine and superfine merino wool is weighted more towards a lifestyle choice than a business.

## 3.4 Prices received

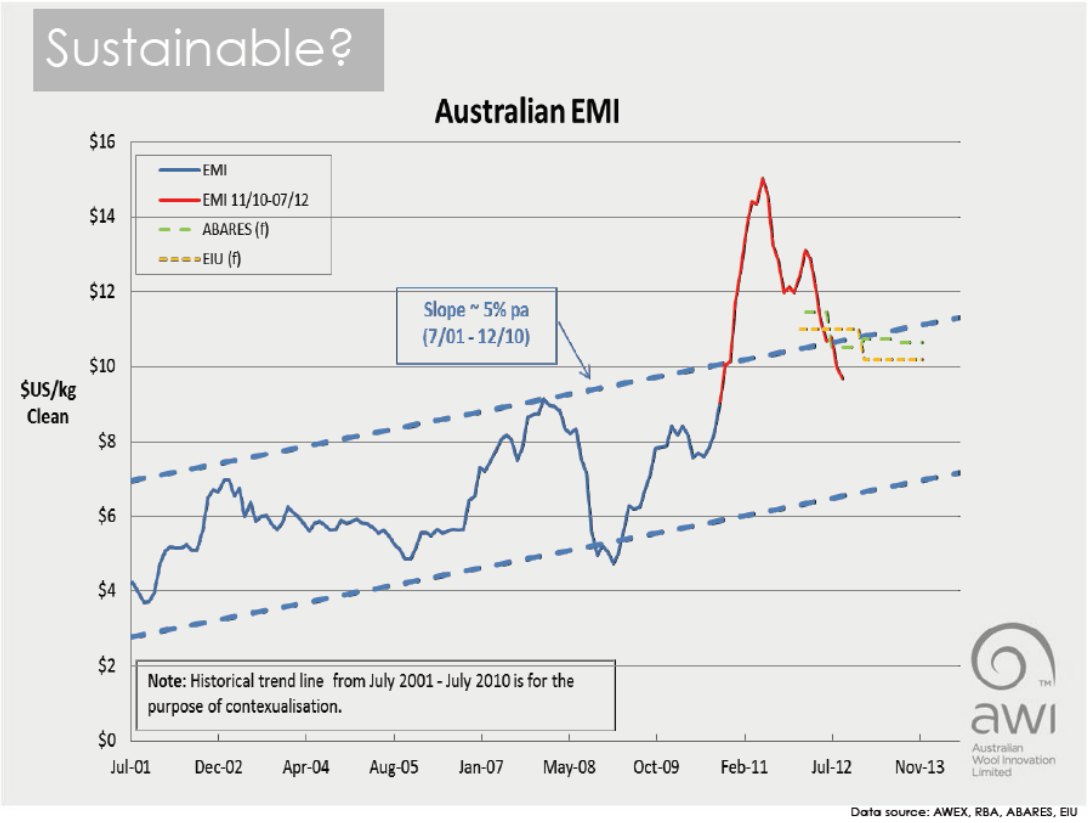
Currently prices received are based mainly on micron and the Hauteur measurement. In the 2011-12 selling season, superfine wool prices fell significantly. For example, the 18.0 micron price guide dropped 34% from 1,997 c/kg on 6 July 2011 to 1,309 c/kg on 14 June 2012. The 17.0 micron price guide dropped 41% from 2,364 c/kg on 6 July 2011 to 1,390 c/kg on 14 June 2012 (Anon, 2012 [(b)]).

These prices reflected a slowdown in demand, especially from China, and extreme volatility caused by economic concerns in Europe. Superfine wool prices were hit hardest, with the impact of lower demand exacerbated by the increase in wool supply (Wilcox 2012). Information on China's domestic wool consumption during late 2012 and into 2013 was unavailable at the time this report was being completed.

While the Chinese domestic market's desire for western-style apparel continues to grow, the European slowdown is affecting China's wool export industry as follows:

- China's wool top exports have dropped 24% in value and 32% in volume respectively year on year (2010-11 to 2011-12)
- Exports to Europe, which account for 40% of China's wool top exports, are down 37% year on year
- Exports of knitwear are down 8% year on year overall, with exports to Europe down 29%
- Exports of wovens are down 21% year on year (Swan 2012).

The chart below illustrates trends in the Eastern Market Indicator (EMI) since 2001. Roughly speaking, price peaks occur every 2-4 years, suggesting that to maximise profit over time, wool growers need to forward contract and/or be prepared to hold wool until their cost of production is met or exceeded.




## 3.5 Selling systems

Alternative selling systems to auction that were briefly examined by this Review include:

- Wool pooling through The Merino Company (including organic wool and carbon neutral wool)
- Direct marketing through branding (eg Australian Extrafine Merino, Zque (New Zealand Merino destined for Reda's Rewoolution collection among others), Saxxon (Escorial), eWool/New Merino (Vandeleur)
- Electronic selling through Wooltrade (which includes only **AS** types under superfine, and does not incorporate unmeasured information).

Alternatives to auction have not attracted high levels of superfine wool grower participation, with the auction system remaining growers' preferred selling method. Selling, broking and exporting wool are all specialised fields. Few growers have the expertise or the capacity to undertake these roles. Other impediments to grower participation include large discounts for supply variations, and unpredictable weather impacts on growers' wool clips.

Furthermore, growers see the auction system as flexible and low risk. At relatively short notice they can schedule sales of their clip or lines of their clip for sale to take advantage of price spikes, secure in the knowledge that they will receive their funds within two weeks of sale.

## 3.6 Marketing programs

AWI is currently undertaking marketing programs aimed at increasing awareness amongst brands, designers and consumers about the desirable qualities of fine and superfine wool (all breeds).

Progress with these initiatives is briefly described below. More detail is available in the *AWI Annual Report 2011-12* (Anon, 2012[(c)]).

The ***Merino. No finer feeling*** campaign has included endorsement by brands such as Armani, Zegna and Loro Piana. It informs a new generation of consumers about the attributes and benefits of merino wool. It positions Merino wool as the premium luxury fibre of choice. In 2011-12 the campaign focussed on touch, showing that Merino wool is fine enough to be worn next to skin, and can be made into lightweight fabrics suitable for trans-seasonal use.

The ***Campaign for Wool*** , whose Patron is HRH The Prince of Wales, is a global campaign that encourages manufacturers, retailers and designers to choose wool and, in turn, educate consumers about wool's environmental benefits. A highlight of 2012 was the Wool Modern exhibition in London, opened by their Royal Highnesses the Prince of Wales and The Duchess of Cornwall. This exhibition showcases the aesthetic, environmental and technical benefits of wool with stunning fashion pieces, installations and products.

The ***China Luxury Market*** campaign launched in December 2011 aims to reinforce Merino wool's premium credentials and build market share for wool in the rapidly-expanding Chinese women's wear segment. It uses multi-media to drive the message of merino wool to Chinese women through television, radio, print, online, social media and in-store promotion. This program is entering its third year. Previous years focused on the rising business elite, mainly men. The second focused on influential women. ASWGA has assisted AWI with this program.

AWI's ***Mothers and Babies*** program drives demand for merino wool in the baby and infant wear market. It funds scientific research into merino's health benefits, innovative product development, and creating awareness of the fibre's benefits. AWI and famed photographer Anne Geddes joined forces to launch the program.

These programs appear to have rekindled interest in superfine wool apparel as a whole. However, identifying the actual impact that these initiatives may have had on demand and prices for high quality superfine merino wool, or what would have happened to demand and prices without them, has been beyond resources available for this Review.

## 3.7 Research and development – off farm

AWI R&D programs with a focus on fine and superfine merino wool are briefly summarised below. AWI also produces a monthly electronic Market Intelligence report that includes superfine wool coverage. Further detail is available in the *AWI Annual Report 2011-12.*

***The Wool Lab*** is a seasonal guide to the best wool fabrics and yarns in the world, across all microns, to inspire textile companies to use wool in their apparel collections. The fabrics and yarns have been selected by AWI from the collections of the world's leading textile companies. All the fabrics and yearns are commercially available to retailers and designers and feature merino wool products from partner mills and spinners such as Zegna Baruffa and Botto Poala. AWI presents *The Wool Lab* at the most important textile and fashion trade shows in the world.

AWI is supporting research into the use of ***Superfine Merino Knits*** to alleviate symptoms of chronic skin conditions. Early results indicate that, far from being a skin irritant (as is still widely perceived in China), Superfine Merino Knitwear can substantially reduce symptoms for sufferers of chronic skin conditions, through its moisture and temperature management properties.

Identifying the impact that these initiatives have had on demand and prices for high quality superfine merino wool, or what would have happened to demand and prices in the absence of the initiatives, has been beyond resources available for this Review.

AWI has invested in the Sheep CRC's ***ComfortMeter*** project which will enable the production and marketing of wool garments that need to meet critical next to skin performance criteria for consumers in the key emergent wool apparel markets. It is close to commercialisation. AWI is also investing in the Sheep CRC's ***HandleMeter*** project, which will be used to measure a fabric's handle – the way it feels.

If successfully commercialised, both the *ComfortMeter* and the *HandleMeter* could be expected to add value to high quality fabrics made from superfine merino wool by objectively measuring attributes that at present can only be assessed subjectively.

# 4. Future operating environment

## 4.1 Improving global economics, demographics and markets

The following points, which suggest that global economics, demographics and markets are becoming more favourable for wool, were made by AWI representatives in Wool Poll presentations in late 2012:

- On average, the wool Eastern Market Indicator (EMI) has increased 5% per annum from July 2001 to July 2012
- Demand growth for wool is driven by global Gross Domestic Product (GDP) growth. China's share of global GDP growth is rising from 5% in 2006 to a forecast 15% in 2017, while the Asia-Pacific share is rising from 23% in 2006 to 34% in 2017
- Consumer spending growth in China is forecast to grow at 8-9% per annum between 2010 to 2017, while Japan and the US are forecast to resume growth
- Over the next 10 years, per capita clothing expenditure growth in the BRIC countries (Brazil, Russia, India and China) is forecast to increase at 40%-70%, and in the Eurozone and US is forecast to increase from -10% to +20% (the latter mainly in Germany and Japan). Much of this share of expenditure growth will be by wealthy people
- For Australia's key traditional wool markets: over 50 year olds will dominate by 2016, especially in the UK, France, Germany, Italy and Japan and this cohort of people will have more than 50% of their countries' disposable income; there will be fewer suit wearers, declining birth rates, and hence new product categories will be critical, eg infants/maternity, urban, below-the-waist casual
- Key drivers in growth markets will be affluent ageing and 'little emperors' (doted on babies and toddlers)
- In addition to Russia and China, other emerging markets will be important eg Turkey and Belarus, and AWI is now providing technical assistance in Vietnam
- Consumer attitudes to wool can improve, for example between 2007 and 2011 in China, consumers developed more positive perceptions for wool in the following areas: is a symbol of status; is expensive; is worth paying extra for; is a classic fabric; and is natural (Swan, 2012).

## 4.2 Global production trends

AWI Wool Poll presentations indicate that at present Australia produces more than 90% of the world's fine apparel wool, and that there will be little or no change in the proportion of apparel wool produced by the main supplying countries. Supply will remain tight. However there is anecdotal concern that countries such as Kazakhstan (a neighbour to China) are rapidly increasing their supply of superfine merino wool and are exporting this wool to important Australian markets such as China (Ive, 2012).

One report (Schoenian, 2009) accessed by this Review that suggests much of the fine-wool grown in South Kazakhstan lacks the quality to compete in international markets, and that the first step towards finding acceptance in the world market will be to have the wool core-tested. Like wool in the United States, it is necessary to know the fibre diameter, length and yield of a wool clip in order to find a suitable buyer and negotiate a fair price. In addition, Schoenian comments that it will be necessary for Kazakh sheep farmers to make improvements in sheep breeding and management and wool handling in order to bring their wool up to international standards.

A watching brief must be maintained and reliable data obtained on global production of superfine wool and other prestige fibres, the quality and standard of preparation, and the implications for Australian growers.

## 4.3 Australian production environment

### *Productivity constraints*

Many public sector agricultural research and extension programs focus on increasing productivity as the key to increasing viability. Over past decades as the cost-price squeeze intensified, this has been an appropriate strategy for extensive cropping industries and livestock industries on better land in more favourable environments.

Increasing productivity has helped some superfine wool growing families to remain in business. In terms of productivity per hectare, Cost of Production participants in this Review indicated that their figures for greasy wool produced per grazed hectare ranged from 7 kg/ha to almost 22 kg/ha.

It could be expected that the higher figure would have come from better than average land that received above average rainfall. In fact, the latter figure was achieved by a Bold Superfine Merino business running wethers on typical non-arable superfine wool growing land, receiving similar rainfall to other properties participating in the Cost of Production exercise.

Hence at first glance there appears to be scope for other superfine wool growers to further improve productivity as the key to remaining viable.

However, native vegetation protection legislation now prevents superfine wool growers, a majority of whom depend on native pastures (ASWGA 2011), from productivity-increasing activities pursued in previous decades by the Bold Superfine Merino business (for example sowing legumes, applying fertiliser, and intensifying grazing).

Woolgrowers are also required to comply with increasingly complex taxation and occupational health and safety laws that involve increased costs and heavy penalties for non-compliance.

### *Climate Change*

In the future, if climate change predictions are correct, it may not be feasible for wool growers to achieve large increases in productivity, even on exotic pastures on deeper soils. The *Southern*

*Livestock Adaptation 2030* project funded by AWI, Meat and Livestock Australia (MLA) and the Department of Agriculture, Fisheries and Forestry (DAFF) has found that:

- The majority of future climate scenarios suggest that much of southern Australia will potentially have higher temperatures and less rainfall, with higher growth rates in winter and early spring, but the spring growing season will contract, with an earlier onset of the dry summer period – these factors will require lower stocking rates to maintain ground cover
- Sustainable stocking rates are set to decline due to lower and more variable pasture growth and longer periods of pasture decay over summer. The lower stocking rates may be partly countered by increases in production per head due to higher pasture legume content and lower lamb mortality
- For some areas, eg parts of Tasmania and mainland higher rainfall/colder regions, the outcomes could be positive
- Increasing soil fertility is the most effective and persistent adaptation for wool growers (Anon, 2012 [(d)]).

**Large productivity increases on an industry-wide basis for superfine merino wool are unlikely to be achievable in the future due to legislative and climatic constraints. Hence the focus for action to improve viability must be on increasing wool prices.**

### *Community expectations*

Woolgrowers are facing increased calls from domestic and overseas consumers of woollen products and sheep meat that the products be produced only in accordance with consumer expectations of acceptable animal welfare. Their concerns extend not only to mulesing, but also to live sheep exports, which in 2012 were adversely portrayed in the media by animal rights activists. Greenhouse gas emissions from sheep are also a concern.

In this challenging environment, ASWGA should continue to drive close contact between its grower and processor members, and assure brokers, buyers, exporters, processors, retailers and consumers that members' clips are grown and prepared using best practice for fibre purity and quality, animal husbandry and welfare, and ecologically sustainable production.

Costs in meeting consumer expectations, as well as production costs, will continue to increase.

# 5. Learning from the past, tips from the present

A number of previous reports on the wool industry and superfine merino wool growing in particular were examined during this Review. Several recurring themes emerged, including:

- Lack of viability
- Superfine merino wool growers leaving the industry or changing enterprises
- Special characteristics of superfine merino wool that are not duplicated in other fibres
- Challenges in describing and measuring the characteristics
- Challenges in educating supply chains about the characteristics
- Difficulty in demonstrating value of the characteristics to supply chains
- The impact of a high Australian dollar
- The importance of global economic growth.

These themes can be recognised throughout the report extracts presented below.

## 5.1 The past

### *1978 ASWGA policy paper by Merv Mibus*

*There have been a lot of casualties from the ranks of superfine breeders and growers – a lot of growers have been lost to the industry, are phasing out, or have introduced stronger woollen rams. .... Why have these people changed? Quite simply because compared to medium and strong wools, the superfines are not a financial proposition.*

*...our Saxon superfines have other characteristics, characteristics which over the years have made them a prestige fibre, characteristics which given due recognition put us in that exclusive category – superior – clearly in front. Our Saxon superfines have these characteristics which have never been accurately measured by instrument, but assessed by the expert skills of the hands and the eyes for their character, style, bloom, texture and handle. ....If our industry is to survive it will only do so as an exclusive, superior, top quality product; it will not survive if we turn it into a bulk commodity!* (Mibus, 1978)

### *Diversity and Innovation for Australian Wool: Report of the Wool Industry Future Directions Task Force, 1999*

*'For many woolgrowers, prices have been too low to keep them profitable or in business.'*

*'product marketing ... is vital, especially at the designer/garment maker level where fibre choice decisions are made.'*

*'Woolgrowers need to examine clinically all facets of their cost structures.... the best 20 percent of woolgrowers earn net returns three times the average.'* (Anon, 1999)

### *Fine wool prospects, Elders/Australian Wool Services, 2005*

*'It was a tough year for luxury items during 2003/04 as a tepid global economic recovery, the SARS outbreak in China and the war in Iraq all placed downward pressure on consumer confidence and thus spending.'*

*'the emerging middle class in China, with 100 million middle income households, are looking for higher quality products which should help sustain demand for wool garments, particularly finer wool.'*

*'Improving demand trends and a forecast production decline are positive for fine and superfine wool prices for 2004/05, but the strong Australian dollar, high oil prices and a potential slowdown in economic growth within major wool purchasing countries in 2005 may constrain upward price movements.'*(Anon, 2005[(a)])

### *ASWGA/Australian Extrafine Merino (AEM) Pilot Supply Chain 2004/05*

*'... the programme is assessed to have made a positive impact on the promotion of the top end market for men's suits made from Australian superfine wool.'*

*The AEM – Ram's Head branding is expected to justify the price to consumers and increase the volume of sales, rather than pushing their unit prices up ..... [because ] the Brands ..are already positioned at the very top end of the price scale for custom made suits or made to measure suits.'*

*'Reports show a difficult position for textile retail in Japan during the period [and] overall there was a decline of 9.5% in the volume of men's suits sold during the period.'* (Anon, 2005[(b)])

### *Test Marketing Project USA 2006*

*'...at the very least in the US market, the words 'merino' and 'wool' had to be used in conjunction with 'new wool' and 'wool evolved' to distance this wool from other poor quality wool to change perceptions. This was to get American women away from their 'itchy/scratchy' perceptions of wool and take them to a new mindset.*

*Focus groups and research showed that the fastest way to get their heads around 'new wool' was to liken it with fine wine – that it is special, and like the finer things in life, it is worth paying a premium for. Highlighting*

*the special qualities of Fine and Extra Fine Merino Wool was important to clearly position it as superior to other wool US consumers may have tried and rejected.'*

*'As we remind consumers of the things they need to watch out for, their response is always the same: Well, tell me how to tell the difference? I need some kind of easy differentiator; a word, an icon, a story, some kind of a wake-up call in the marketplace to shift perceptions and make it clear for me that I should be on the lookout for these specific benefits.'*

*'One of the 'sweet spots' is staff training – with sales associates educating themselves to better educate consumers'*

*'...innovation is essential to keep product new and fresh. And it is particularly important to show retail buyers how to develop new innovative product with wool...'*

*'...the 'Wool Story' is everything and must be told as close to the point-of-sale and shop floor as possible.'*
(Anon, 2007)

**Lessons from the past**

The following conclusions can be drawn from the above points, and the more detailed content of the past reports:

- The superfine merino industry is a difficult business – global economic conditions have been volatile for many years, and will continue to be a major influence on consumer demand for high quality products made from superfine merino
- Demand can be improved by strategic product innovation and targeted product marketing initiatives. However, to-date marketing initiatives have only increased volumes sold, not prices received by growers. Global economic conditions are the dominant influence on prices to growers through the auction system.
- Selecting countries in which to conduct pilot programs and product marketing campaigns is important. Potential return on investment can be adversely-affected by country-specific economic issues, for example the Global Financial Crisis originated in the USA shortly after the completion of the Test Marketing Project.
- Targeted product marketing to shift consumer perceptions must incorporate an easy differentiator – the fine wool /fine wine story has achieved this to-date in differentiating fine wools from medium wools. Certification for next-to-skin comfort may be an option.
- With increasing volumes of poorer quality superfine merino and non-merino superfine wool coming onto the market, there is a new challenge for high quality superfine merino growers – how to differentiate and extract more value from the performance of their fibres compared with other fibres

## 5.2 The present

A visit by ASWGA representatives to members' mills and other organisations throughout Europe in late 2012, where samples of AS, M, and M (Bold) wools of similar micron were displayed and discussed, yielded the following comments from the overseas interests (Cathles Pers. Comm.):

*'Raw material attributes are very interesting if there is something unique. Provenance is the greatest value, not the wool! We do need to differentiate why our product should be bought over another (otherwise it is price!)'*

*'We do need to do trials that compare the attributes between AS, M, and M (Bold) wools, in worsted and woollen, through to cloth and knitted. We also need to do trials of worsted into knitted.'*

*'We then need to identify differences between AS, M and M (Bold) and articulate the value of those differences. For example, why is AS different? We need to be able to recognise special values in AS to pay more. We also need current data on quantities of the three types, their characteristics, and prices for the previous 12 months.'*

*'R&D is crucial, but persuading purchasers about wool attributes is the biggest education needed. Trials of AS, M and M (Bold) would be worthwhile, to deliver important measurements in fabric.'*

*'We [currently] have a measurement chart to sell greasy wool [to processors] that articulates the attributes of raw wool based on scientific analysis.* ***We need [to develop] an attributes chart, established through scientific trial and drawn from the consumers' language, that articulates the attributes for each [of the three] wool types. Thus establishing the value at the only place willing to reward [special] attributes – the retail consumer.'***

# 6. Current problem statement

Elements of the current problem affecting all three superfine merino wool business strategies described above in section 2.2 are not dissimilar to the recurring themes identified in the past. However, there are three key differences today.

Firstly, we have one dominant market that is relatively new in recognising and appreciating the special characteristics and the value of those characteristics in producing high quality superfine merino wool products. Secondly, there is almost sole reliance by wool buyers on measurements, resulting in a significant decline in premiums for high quality, well-prepared clips that possess currently un-measureable attributes. Thirdly, there is increasing availability of poor quality superfine merino wool and non-merino superfine wool (for example, from Dohnes and SAMMs).

The current problems can be described as a 'downward spiral' thus:

1. Higher meat prices and lower wool prices have resulted in breeders increasing emphasis on growth rates and carcase weights at the expense of traditional superfine merino wools
2. Increased shearing and wool handling costs, coupled with low returns for wool, have lowered clip preparation standards
3. Of the total superfine clip, there is an increasing proportion of poorly-bred wools and poorly-prepared clips, which produce measurements similar to high quality wools, eg for micron, yield, staple length and strength, coefficient of variation of length, and position of break. **The increasing supply of inferior merino wools and non-merino superfine wools, and the fact that micron is the only measurement that continues through to retail, compound the effect of lack of demand on wool prices**
4. Our major customer appears to buy predominantly on micron and hauteur, and **supply chains for it and other customers do not identify the value of intrinsic qualities in high quality wools which are currently assessable only by visual inspection. In addition, there is no simple mechanism whereby consumers can recognise quality and to relay their preferences back through supply chains.** The *ComfortMeter* and *HandleMeter* may assist in partly overcoming this issue if processors see value in tracing fabric back to raw product
5. Prices received at auction continue to be volatile. Price rises and falls in excess of 30% during one selling season are common, with even higher rises and falls (>100%) occurring over two to four year periods. Timing the sale of a wool clip to achieve a price that meets or exceeds the cost of production can have a major bearing on growers' viability, but in reality such timing is difficult for most growers to achieve

6. Premiums for style, compared with Style 5 [good topmaker], have declined in both cents/kg and percentage terms since 2004-05. This decline is particularly evident for Style 1 [choice] and Style 2 [superior] (Nolan, 2012). The decline is the result of a major change in the way wools are valued by buyers. **The price setting mechanism has changed from a market that pays higher premiums as quality rises to a market that applies bigger discounts for increasing variation down from perfection**

7. Notwithstanding the AWI marketing initiatives mentioned above, global demand for premium quality superfine merino products remains weak. Buyers for European customers who do recognise and have in the past paid a premium for high-quality wools do not compete strongly with buyers for Chinese customers, hence the price to growers is lower than it would be otherwise

8. More growers of well-bred superfine merino wools become disheartened and decide to increase their emphasis on growth rates and carcase weights at the expense of high quality wool production, and/or pursue other enterprises. Succession planning sees the next generation of potential superfine merino wool growers deciding to enter more rewarding occupations and businesses.

**Key points**

Recurring themes within changing contexts over three decades demonstrate the critical importance of **continuity in targeted product marketing** for high quality superfine merino wools as the world's preferred prestige fibres.

It is also critically important to **innovate methods and techniques to prove that quality superfine merino wools do have special attributes**, and in doing so, provide the means to demonstrate their potential value in supply chains.

**There is still no effective way for consumers to differentiate between high quality and poor quality superfine wool products, and to relay their preferences** back through supply chains.

**Attempts to use superfine merino wool mystique and provenance as differentiators have been ineffective to-date** – there remains a dis-connect between consumers and wool buyers, with wool buying decisions based almost solely on measurements.

**Good market intelligence is also essential**, including predictions of global trends affecting demand and prices within and across selling seasons. To maximise long-term profit in growing high quality superfine wool, producers need access to this intelligence and financial mechanisms to hold wool for long periods if necessary.

# 7. The way forward

## 7.1 Confirm the key underlying issue

The key underlying issue causing the problem for high quality superfine merino wool is that **there is limited consumer appreciation of the benefits for them of products made from high quality superfine merino wool, which leads to a lack of consumer desire for products made from it, and hence lack of consumer willingness to pay high prices for those products**. This situation, coupled with the absence of a mechanism to relay consumer preferences back down through supply chains to wool buyers, means there are few to nil signals encouraging buyers to purchase high quality superfine merino wools for production of premium products.

In the case of ultrafine merino wool produced from shedded sheep, the market was underpinned by limited competition, and when some of the buyers left the industry, the price collapsed. It is unlikely that the superior position of cashmere over ultrafine merino will change without a targeted marketing campaign for ultrafine wool.

This lack of consumer appreciation and demand translates to a lack of competition between our major customers, China, India, Italy, and others, for our premium wools. We need to also enhance demand from additional potential buying countries, such as Russia.

To understand this lack of demand and the resulting lack of competition, we need to start with the retail consumer and work back.

**Key points**

The underlying issue – a lack of appreciation for quality superfine wool and hence lack of sustained high demand and prices – is similar to that expressed in 1978 by Merv Mibus.

However, it appears we face greater challenges today. The $A is at or near parity with the $US, and the global apparel industry is more cost-competitive than ever. Price premiums for elite ultrafine wool, which used to have an upward influence on prices for high quality superfine merino wool, have disappeared. Superfine wool has become a generic commodity, which more growers are producing down to a price. The superfine wool clip comprises increasing volumes of inferior merino wools and non-merino wools.

In essence**, there needs to be significant improvement in investment in ultrafine/superfine product innovation and targeted product marketing**, focussing on assisting consumers to differentiate between products made from high and low quality superfine wools, encouraging them to lift their demand for the former, and to relay their preferences back through supply chains to wool buyers.

This focus is especially applicable to wealthy consumers who are price inelastic (price is a minor or irrelevant issue for them when choosing luxury apparel), and whose buying decisions are likely to be unaffected by a strong $A.

## 7.2 Acknowledge constraints to productivity increases

Over the last 20 years, ultrafine and superfine wool growers have stayed in business by either increasing productivity, reducing costs, holding wool to sell during market spikes, or by subsidising their wool growing businesses using income from other agricultural enterprises or from off-farm investments or employment.

In future, further important productivity increases may come from improvements in sheep genetics, improved technologies (for example in predator, parasite and flystrike control), and improved pasture management including more effective fertiliser use.

The rate of adoption of these technologies and practices will be governed by the prevailing legislative and climatic circumstances, the knowledge, attitudes, skills and aspirations of wool growers, the extent to which the technologies and practices offer growers comparative advantage over existing technologies, and the ease with which they can be trialled and put into practice on larger scales.

However, even if all these advances do eventuate, it is difficult to envisage the superfine merino industry as a whole achieving the three-fold increases in productivity that some growers have achieved in the past. Climatic and legislative conditions, and to a lesser extent community expectations, will prevent this.

## 7.3 Focus on achieving wool price increases

**Limits to productivity improvements mean that wool price increases must be the primary focus of strategies and actions aimed at increasing superfine wool growers' viability.**

The best way to achieve a sustained increase in prices and minimise the dramatic price swings referred to in the **Current problem statement** is to ensure targeted product promotion, research and education activities correctly anticipate global developments and that they are targeted to the right countries, and the right supply chains within those countries, in a timely way. An appropriate level of investment is also critical.

However, notwithstanding effective promotion, research and education, there will always be some unforeseen developments affecting markets, and growers need a 'Plan B' to manage the remaining price volatility to their advantage.

Growers already have options to smooth out price volatility (forward contracting, holding wool in-store etc), but there is low uptake of these options (Hedley, 2012). The key reason for the low rate of forward contracting is that forward prices are usually below most growers' cost of production and growers are naturally reluctant to lock in a loss. Forward contracting is also considered high risk as it is difficult to predict climatic conditions and their effect on the clip 12 months or more out from the time of negotiating a forward contract.

In addition, truly independent market intelligence (especially future developments in major wool buying and consuming countries) is scarce, and growers' decisions about selling are often made largely in an information vacuum.

To their detriment, growers frequently sell at low points in the market, 'because they need the cash flow'. Yet for every seller there is a buyer, and in these circumstances the higher profit usually goes to informed people in the trade who understand reasons for the low point, the factors that lead to market rises, and who have the financial capacity to ride out the low periods.

As an example, in recent years the prices of several Australian commodities (eg wool, cotton, lamb, and iron ore) have largely reflected expectations about China's growth. Between February-April 2011 when prices of these commodities peaked due to positive sentiment about China, and July 2012 when concerns about a hard landing in China were extreme, the wool EMI fell 50%, cotton fell 63%, lamb fell 40%, and iron ore fell 44%.

By mid-January 2013, following dissipation of more extreme concerns about China, and more positive news from the US and Europe, the 17 micron wool indicator had risen more than 15% and the iron ore price had risen more than 50%. Interests who bought these commodities at July-August 2012 prices may have made good profits in just five months.

**Key points**

An opportunity exists to improve the availability of **independent market intelligence** to growers, including predictions of global trends in demand and likely prices, and the factors affecting those trends, within and across selling seasons.

As it may be in growers' best interests to hold wool so they can time selling it to their advantage, there is also an opportunity to enhance growers' business management skills to ensure they can access the necessary financial arrangements.

How do we ensure growers have the necessary business and financial skills to **hold wool until the price at least meets their cost of production**, or better still, generates a surplus?

One caveat about focussing on wool price increases is that it is difficult to see short to medium term prices for shedded ultrafine Saxon wool returning to viable levels, because:

- There is global underuse of these wools
- Current held stocks are very high in relation to current demand
- Although the quantity of ultrafine merino wool is only about 2% of world cashmere production, it is no longer perceived as rare, therefore it does not offer processors and brands the high value competitive edge that it did in the past
- Improved processing techniques can now superficially give fabrics from superfine wools the attributes that could previously only be delivered by ultrafines
- Grain prices are likely to remain high with increasing global food demand.

Some premium products are still made from shedded ultrafine merino wools, but they are used by leading global brands such as Ermenegildo Zegna and Loro Piana as flagship products to promote the prestige of their brands. The products are not volume sellers. In the past there was higher demand for raw ultrafine merino wool from shedded operations as mills bought small volumes to prove that they could process them. However many were unable to find markets for their products as demand fell away (Cathles Pers. Comm.).

## 7.4 Take advantage of favourable global developments

AWI has indicated that out to 2017 the global wool market will be favourable, characterised by:

- Tight supply, with Australia's dominance of fine apparel wool and the ability to supply unchanged
- The emergence of China and other BRIC countries as affluent consumer markets underpinning growth in clothing expenditure
- Elsewhere, market drivers implying a need to focus on affluent consumers, and creating new categories such as infants/maternity
- Improving consumer attitudes to wool.

## 7.5 Describe what success would look like

A sustainable increase in prices for high quality ultrafine and superfine merino wool, along with enhanced grower viability, will be delivered when a series of industry-wide goals are achieved.

***Production and reporting***

- Quality superfine merino wools will be better recognised, specified and differentiated from other superfine wool, from shearing to retail
- Superfine wool testing, specification and selling systems will maximise the use of new technologies to enhance operation of the auction system and assist further development of alternatives to auction
- Wool testing, appraisal and sale reporting will be enhanced to provide reliable information on the profile of the Australian superfine wool clip, particularly for microns, volumes and prices for the main types of superfine merino wool (eg **1PP**, **AS**, **M**, and **M** (Bold)) and their styles (eg Choice down to Average Topmaker), and volumes and prices for of other superfine wools (eg SAMMs and Dohne)
- AWI will enhance its market intelligence systems that monitor global markets for superfine wool and other prestige fibres, and enhance monitoring of trends in other countries' production of fibres that can potentially compete with Australia in global markets

***Supply chains, innovation, marketing, consumers***

- There will be increased awareness within supply chains of the attributes of high quality superfine merino wools, their added value to processing and manufacturing at each stage of supply chains, and their added value to consumers
- AWI will continue to develop new and innovative products made from superfine merino wool, and will enhance its targeted product marketing and promotion for superfine merino wool, especially in the Asia-Pacific and emerging economies
- AWI's initiatives in partnership with leading brands and retailers will stimulate increased consumer demand and advocacy for high quality superfine merino wool products. This will translate to increased competition amongst Australia's customer countries for quality superfine wool, and hence increased prices for growers
- AWI, ASWGA, and supply chains will design and implement mechanisms and language to articulate consumer preferences concerning superfine merino wool from retail back to wool buyers

***AWI and ASWGA working together***

- AWI and ASWGA will work on a cooperative and collegiate basis to improve program adaptation, monitoring and evaluation, attribution of the programs' effects on demand and prices for superfine and ultrafine wool, and communication with the superfine wool industry
- ASWGA will attract the majority of high quality superfine merino wool clips into its network, by developing an effective value proposition for new members, including improved market intelligence and business management skill upgrading
- ASWGA will strengthen recognition that rams head branded superfine wools have more valuable attributes than other superfine wools
- ASWGA and AUSFINE ™ will continue to collaborate for the mutual benefit of their members

***Growers***

- The number of new entrants to the superfine wool industry will increase as they access improved genetics, improved farm management practices, and improved business management skills to make superfine wool growing more viable
- Superfine wool growers generally will improve the way in which they grow and prepare superfine wool
- Growers will have access to improved market intelligence including predictions concerning global demand and prices, access to business management training and access to financial arrangements to hold wool for long periods.

## 7.6 Set out core strategies to achieve success

There exists a significant opportunity to improve wool buyer to retail consumer appreciation of the attributes of premium superfine merino and their advantages, and in particular, our major customers' understanding of the premium products that can be produced from different types of superfine wools.

To make the most of this opportunity, Australia needs to continue to foster working partnerships with Chinese, Indian, Italian, United Kingdom and other important superfine wool buying countries to:

- Implement a ***Campaign for Superfine Merino***, including re-branding and re-launching ultrafine merino. The Campaign should rebuild the prestige and markets surrounding **1PP** and **AS** types – the 'flagships' of the ultrafine/superfine merino industry
- Ensure the *Campaign's* product innovation and product marketing activities focus on assisting consumers to differentiate between products made from high and low quality ultrafine and superfine wools, encouraging them to lift their desire and demand for the former, and to relay their preferences back through supply chains to wool buyers
- Monitor and evaluate the *Campaign* to ensure that it is delivering increased prices to Australian growers of ultrafine and superfine merino wool. Re-direct and adapt the Campaign accordingly
- Improve the way we technically specify and describe the attributes of ultrafine/superfine wools throughout supply chains (from the *Code of Practice* at shearing to swing tags in retail stores) – curvature R&D and reliable tests have an important role
- Ensure technical specifications clearly differentiate between **AS**, **M** and **M** (Bold) superfine merino wools, the differences between 1PP and Styles 1-6 of these wools, as well as the differences between these merino wools and wools from SAMMs and Dohnes
- Understand how these technically different wools process, identify what the processing advantages are for each, and how they can be made into new and innovative products
- Use this understanding of technical and processing differences to add value and engage each stage of supply chains to get uptake
- Ensure wool testing and market reporting arrangements provide detailed information on the profile of the Australian superfine wool clip, particularly for microns, volumes and prices for the main types and styles.

In parallel with the above strategies, AWI and ASWGA should work together on a collaborative and collegiate basis to:

- Enhance grower and processor knowledge and commitment to high quality superfine merino wool through effective communication and engagement during implementation of the strategies
- Ensure that AWI programs are more effective in increasing demand and prices for superfine and ultrafine wool, and that there is transparent attribution of the program's results
- Improve availability of independent market intelligence to growers, including predictions of global trends in demand and likely prices, and the factors affecting those trends, within and across selling seasons
- Enhance growers' business management skills to ensure they can access necessary financial arrangements.

## 7.7 List researchable questions giving effect to the strategies

1. Can various ultrafine and superfine merino wools be differentiated in terms of their characteristics that affect end product type and quality. For example, how do you describe high quality ultrafine/superfine merino, lower quality ultrafine/superfine merino, various non-merino superfine?
2. What are the key characteristics that influence ultrafine/superfine merino end product type and quality? Can the characteristics (eg curvature, elasticity, drape, comfort etc) be measured objectively with a view to certification and extracting value along supply chains? How do we get uptake by supply chains of any extra value?
3. If the characteristics can't be measured objectively at present, is there a business case to invest in developing the necessary tests and tools to aid quantification? Would investment in qualitative education using existing measurements and 'hands on' assessments be better?
4. What are the various types and qualities of products that can be made from these wools (and their blends?)
5. What proportion of ultrafine/superfine wools produced globally are high quality, poor quality, and non-merino? What are the standards of preparation of superfine wools from supplier countries that compete with Australia? What are trends in volumes and prices for each of these?
6. How do we establish wool testing and sale reporting arrangements that provide more detailed information on volumes and prices for all wool types and styles in the Australian superfine wool clip?
7. Could a business case be developed for a ***Campaign for Superfine Merino, including re-branding and re-launching ultrafine merino***, that in addition to stimulating demand from high-end consumers, would answer these questions in partnership with processors, brands, designers etc?
8. Could AWI provide funding support to ASWGA in return for assistance in making AWI programs more effective in increasing viability of the superfine wool industry?
9. How can independent market intelligence be gathered and communicated to growers?
10. How can growers access improved business and financial management skills including the capacity to hold wool for long periods?

# 8. Conclusions and recommendations

## 8.1 Conclusions

This Review builds on other investigations into the superfine merino wool industry over recent decades. It is a timely reassessment of the where the industry is at, and its challenges and opportunities. It has drawn the conclusions outlined below.

### *Favourable global outlook, but expect similar challenges as in the past*

Notwithstanding a favourable global outlook for wool generally in terms of economic growth, demographics and markets, the superfine/ultrafine merino industry will remain a difficult business – key challenges in the future will be similar to those over the last 30 years, viz volatile global economic conditions, markets that don't sufficiently recognise and value the attributes of high quality superfine/ultrafine wools and products made from those wools, and competition from alternative fibres. A contemporary difference to the past is that the main competing fibres today are poorer quality superfine merino wools, and non-merino superfine wools.

### *Opportunity to improve market intelligence, promotion, marketing, and research. Continuity of investment is important*

Ongoing price volatility and inconsistent demand indicate that promotion, product marketing, and research have not kept pace with the changing profile of the Australian superfine wool clip and dynamic changes in global markets, especially the rapid emergence of China as the dominant market, financial issues affecting markets in the European Union, and the economic rise of some former Eastern Bloc countries.

**There needs to be significant improvement in product innovation and marketing in relation to superfine merino wool. Consideration should be given to developing a *Campaign for Superfine Merino*, including re-branding and re-launching ultrafine merino.** The campaign should focus on assisting consumers to differentiate between products made from high and low quality superfine wools, encouraging them to lift their desire and demand for the former, and to relay their preferences back through supply chains to superfine wool buyers. This focus is especially applicable to high-income consumers who are price inelastic (they buy what they desire irrespective of price), and hence largely unaffected by the strong $A.

**It is essential to monitor the extent to which improved product innovation and marketing and any new campaigns do result in improved prices to superfine merino wool growers, and to re-direct and adapt the programs accordingly.**

In addition to further improvements in market intelligence and timeliness of responses, it is critical to ensure **continuity** in not only promoting and marketing high quality superfine merino wools as the world's prestige fibres, but also in researching methods to prove that they are, and in doing so, demonstrating their potential value at each step in supply chains.

### *Opportunity to increase grower viability through improved access to and use of market intelligence and financial arrangements*

Legislative and climatic constraints mean that superfine wool growers will not achieve viability by relying mainly on productivity improvements. **Hence the emphasis of strategies and actions arising from this Review must be on increasing wool prices received**. Improved market intelligence, coupled with responsive, well-funded and well-targeted promotion, product marketing and research, may deliver an increasing price trend over time.

However, due to inevitable price volatility, growers could achieve greater increases in average price received over time (ie beat the trend) by selling only when their cost of production is exceeded, and preferably only when they can generate a surplus. To do this, **growers need access to accurate market intelligence** which includes predictions of global trends affecting demand and prices within and across selling seasons. They **also need access to the necessary business skills** and the financial capacity to hold wool for long periods if necessary.

### *Cost of production figures indicate Bold Superfine Merino wethers is the only business strategy that may generate a surplus over production costs*

Cost of production figures drawn from a small sample of ASWGA members suggest that even with the prices and favourable seasonal and paddock conditions that prevailed during 2011-12:

- Ultrafine Merino businesses based on shedded wethers or paddock-run self-replacing flocks **do not break even on production costs**, let alone achieve commercial viability
- Traditional Superfine Merino and Bold Superfine Merino businesses operating self-replacing flocks **may break even on production costs but are not commercially viable**
- Bold Superfine Merino wether businesses **may break even on production costs, and have the potential to generate a surplus over production costs, but the surplus is probably insufficient** to achieve commercial viability.

### *Shedded Ultrafine Merino unlikely to return to viability*

Due to large capital and operating expenditures, it is difficult to see ultrafine prices in the short to medium term being sufficiently high for production of shedded Ultrafine Merino wool to return to viability. There is global oversupply and under use of these wools, and their special attributes are not recognised and valued. They no longer offer processors and brands a competitive edge, grain prices are likely to remain high, and improved processing techniques can now give fabrics from superfine wools the attributes that could previously only be delivered by ultrafines.

## 8.2 Recommendations

This Review has been a brief study involving limited consultation amongst the broader superfine merino wool industry, particularly with ASWGA regions. Hence **it is recommended that AWI provide funding for printing and wider circulation of this Review report, and consultation with the industry stakeholders** listed in the Attachments. Should that consultation endorse the core strategies and researchable questions listed in this report or variations of them, **it is recommended that AWI provide funding to reconfigure them as a Strategic Plan, and implement the Plan**.

In addition to seeking the stakeholders' views on core strategies listed at section 7.6 and researchable questions listed at section 7.7, Attachment 2 puts forward possible actions that stakeholders may consider undertaking, consistent with the strategies and questions.

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# People consulted during the Review

(in addition to the Working Group members)

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Kevin Dunn, ASWGA member, immediate past President ASWGA
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Danny Picker, ASWGA member, AUSFINE member, 'Hillcreston Park', Bigga
Jock McRae, 'Eileen Donan', Victoria
Cost of Production participants (anonymous)

# Mills visited (by Helen Cathles, President ASWGA)

*Full report can be obtained from ASWGA*

**Turkey** – Altinyildz

**Italy** – Zegna, Vitale Barberis Canonico, Zegna Baruffa, Schneiders, Tallia Di Delfino, Cerutti

**UK** – Bulmer & Lumb, Johnstons of Elgin, Holland and Sherry, Moxons, Anderson & Shepheard, Modiano, Dormeuil, Retail Connect, WT Johnstons, John Foster, Minova, Jaegar

**China** – Ruyi, Redsun, Thrive, Sudwolle, Schneiders

# Possible actions for discussion

## Brands/retailers

- Enhance product promotion focusing on the low volume/high value/luxury/classy end of the superfine wool apparel price spectrum
- Educate floor staff about the attributes of quality superfine wool apparel that are likely to appeal to their consumers within their cultural context, and the advantages of buying quality superfine wool products over other superfine wool products
- Provide consumer feedback to designers and the supply chain and support the supply chain to adapt to changes in consumer preferences
- Work with designers, wholesalers and processors to ensure the provenance of Australian superfine wool, and in particular ASWGA-branded wool, is verifiable to the consumer

## Processors

- Working with AWI, AWEX and ASWGA, develop improved specifications for the different types and styles of superfine wools, and continue to develop innovative products made from those wools
- Enhance initiatives aimed at improving knowledge and skills in processing and marketing superfine wools, especially in developing and recovering economies
- Continue to promote quality superfine wool as an elite fibre, sought after by luxury brands for its unique qualities
- Work with stakeholders up and down the supply chain to ensure the provenance of Australian superfine wool, and in particular ASWGA-branded wool, is verifiable

## AWI

- Consider investing in the research questions listed in section 7.7 of this Review report and actioning agreed responses
- Enhance superfine wool product innovation and marketing, especially in the Asia-Pacific as these economies come to dominate world GDP
- Work with overseas processors and designers to educate their consumers about luxury apparel and assist them to develop indigenous interpretations of that apparel
- Continue targeted R&D to produce products consistent with consumer and market opportunities
- Ensure market intelligence monitors global production and sales of fibres that compete with ultrafine and superfine merino wool
- Enhance liaison to improve grower feedback concerning AWI priorities and grower uptake of AWI's research and marketing results

## Brokers/exporters

- Working with AWEX, participate in new wool testing and sale reporting arrangements that provide more detail on the profile of the Australian superfine wool clip, particularly volumes and prices for the main superfine wool types and styles
- Provide frank feedback to growers concerning breeding and clip preparation
- Improve two-way feedback between growers and buyers on attributes valued by supply chains
- Identify barriers to alternative selling options and develop new options that deliver more stable prices and improved trace back

- Suggest credible sources of information and assistance to growers

## Growers

- Improve breeding and clip preparation
- ASWGA members operate to codes of practice giving effect to rams head brand values
- ASWGA members maximise net income per hectare within the limitations of their environment

## ASWGA

- If invited, and with funding support from AWI, work more closely with AWI to make AWI programs more effective in increasing viability for the superfine merino wool industry
- Work with its members to develop codes of practice giving effect to *Rams Head* brand values and differentiating members' clips from other superfine wools
- Attract the majority of the quality superfine wool clip to its member network by developing an effective value proposition for new members

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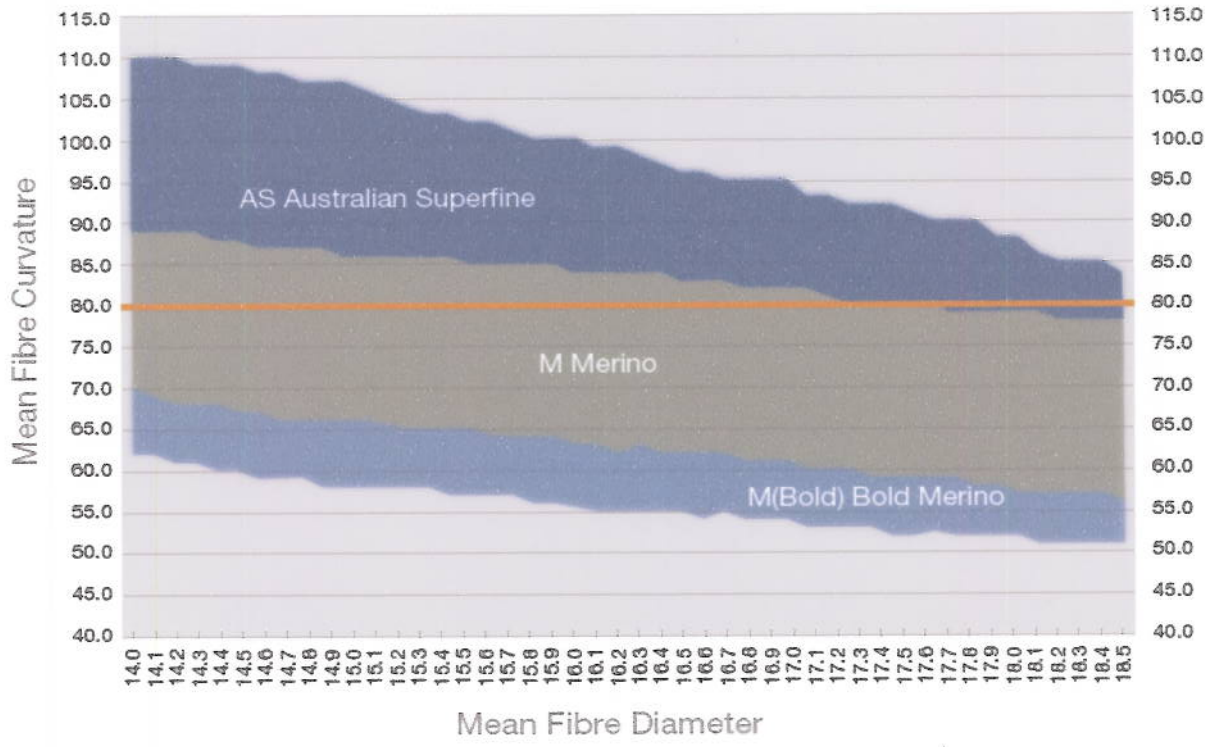
# AWEX-ID Superfine Breed Codes

## Mean Fibre Curvature Guide Zones




**Notes about Mean Fibre Curvature (MFC) and use in AWEX-ID Breed Group Appraisal**

- Precision of MFC is not high. It is typically around +/- 7 degrees/mm. Due to its relatively low precision MFC is used as a guidance measure only. Each appraiser/auditor can apply the AWEX-ID breed they feel best suits the visual presentation of wool.
- Wool that has indistinct crimp characteristic can also record high readings (e.g. Comebacks, Downs).
- However, within the Superfine fleece sector the MFC can be used as a tool to assist the appraiser identifying AS and M - Bold types. (The balance are typed as Merino which may display influences of both Saxon or Bold breeding or neither).
- Why use MFC? Appraisers historically have under appraised the presence of AS bred wool. Using MFC it provokes the appraiser/auditor to make a decision.
- Not all appraisers have measured results when appraising the wool.
- The above MFD/MFC profile is indicative of the general bands of each AWEX-ID breed group. In practice the boundaries between each group is more blurred than illustrated on this chart.

**Superfine Fleece wool (18.5 and finer) by appraised Breed Group 2013/14ytd**

AS 8.1% M 74.7% M (BOLD) 17.2%

**Indicative volumes of Superfine Fleece wool since 2004 using MFC as a proxy for Breed Group.**