

**A subgroup to further advance the ideas  
and information presented at the Future  
Technologies Seminar 2012**

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AUSVEG Ltd

Project Number: VG12079

## **VG12079**

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**A subgroup to further advance the ideas and  
information presented at the Future  
Technologies Seminar 2012**

**1/02/2013 – 30/04/2013**

**FINAL REPORT**



*Horticulture Australia*

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**Purpose of Report:** The purpose of this report is to provide feedback and recommendations from the Farm Productivity, Resource Use and Management Subgroup on the potential for progressing ideas presented by speaker participants of the Future Technologies Summit 2012. The intention of the summit was to prioritise the ideas for future industry investment that had the highest prospect of making a transformational contribution to the ongoing development of the industry.

This report is intended to be used by the Vegetable IAC, and other investment decision making bodies, as a reference for what growers have identified as priorities in their businesses when making recommendations on investment decisions in regards to future technologies.

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**Date of final report:** 30/04/2013

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## **Milestone 109: VG12079 – Future Technologies Seminar**

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**Project Title:** A subgroup to further advance the ideas and information presented at the Future Technologies Seminar 2012

**Project Number:** VG12079

**Project Leader:** Richard Mulcahy – AUSVEG CEO

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**Date of Report:** 30/04/2013

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### **Project Timeline**

**Start:** 1/02/2013

**Finish:** 30/04/2013

### **Milestone Overview**

<b>Milestone Number</b>	<b>Due Date</b>	<b>Description</b>
101	1/02/2013	Agreement signed, voluntary contributions (if required) received and IP arrangements in place
109	30/04/2013	Final report received by Horticulture Australia Ltd

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# 1. Media Summary

A subgroup to further advance the concepts presented at the Future Technologies Seminar 2012 was convened on 2 April 2013, at the Australian Industry Group Conference Centre, 20 Queens Rd Melbourne.

The aim of the meeting was to assess project proposals prepared by speakers from the Future Technologies Seminar 2012, to evaluate research and technology that could be developed into useful R&D projects that align with the overarching goals of the vegetable industry's Strategic Investment Plan.

The participants consisted of a subgroup of representatives of the Farm Productivity, Resource Use and Management Design Team, AUSVEG and HAL.

The subgroup participants were briefed on the latest ideas from researchers that had participated in the Future Technologies Seminar 2012. The researchers were asked to present a potential R&D project to the subgroup for their consideration. The forum gave the subgroup members the opportunity to explore these project ideas and establish new research and development priorities that would provide the vegetable industry with long-term benefits. The mix of participants made the forum a valuable exercise in determining the best investment of available research and development levy dollars in future technologies that may benefit the vegetable industry.

The subgroup identified four areas that could benefit from further research and determined that further liaison between researchers, funding bodies and industry was needed to work up meaningful R&D projects in the short-term. Projects recommended by the subgroup included:

- Development of innovative packaging solutions suitable for export markets.

- Investigating how the vegetable industry can participate in the further development of microwave technology for the management of weeds.
- Funding the research necessary for a fully automated robotic harvesting solution.
- Development of vegetable varieties that are able to be more effectively machine harvested.



## 2. Introduction

The development of technologies beneficial to the Australian vegetable production industry can enhance the long-term sustainability and overall prosperity of the sector.

Rising input costs, scarcity of labour and external pressures such as the ongoing high value of the Australian dollar continue to have dramatic effects on the overall viability of the industry.

The subgroup to further advance the ideas and information presented at the Future Technologies Seminar 2012 was convened to determine which ideas could contribute in a meaningful way to the ongoing sustainability and international competitiveness of the sector.

A subgroup of the Farm Productivity, Resource Use and Management Design Team was enlisted to progress this project and determine which of the ideas could be converted into projects in a timely manner.

The objectives of this project (VG12079) were to explore the potential for implementable projects that would contribute in a significant manner to the ongoing competitiveness of the Australian vegetable industry through technological enhancements.

Consistent with the Future Technologies Forum 2012 the primary objective of the forum was to further explore how future technologies can reduce the cost of labour, increase profitability through technological advancements and explore methods of addressing the rapidly increasing global population.

Specifically, the forum explored technologies such as genetic modification/selective breeding programs, mechanical innovations, microwave technology and advanced robotics.

The forum provided a vehicle for industry to actively foster ideas that could set the future direction of research and development projects.

This forum was not intended to focus on one particular technology, but to consider and prioritise a number of research and development options that could be made available to Australian growers in the short, medium and long-term.

Given all sub group members had prior exposure to the concepts presented by participating researchers, the forum was well-placed to identify priority areas and recommend projects that should be supported.

### 3. Forum Participant List

#### **Sub Group Member**

Danny De Ieso (Thorndon Park Produce)

Richard Dickmann (Bayer CropScience)

Mark Kable (Harvest Moon)

Ravi Hegde (HAL)

Will Churchill (AUSVEG)

#### **Observer**

Richard Mulcahy (AUSVEG)

Kurt Hermann (AUSVEG)

Byron De Kock (HAL)

#### **Presenter**

Graham Brodie (University of Melbourne)

Salah Sukkarieh (University of Sydney)

Sam Birrell (Netafim)

Terry Turney (Monash University)

Thambaramala Gamage (CSIRO)

Roger Hellens (Plant and Food NZ)

#### **Facilitator**

Daniel Leesong (Corporate Communication)

## 4. Meeting Details

The forum comprised six presentations that built upon the presentations delivered at the Future Technologies Seminar 2012. The seminar was focused on projects that could result in significant efficiencies and market improvements, and could be scoped and implemented in a timely manner.

All presenters were asked to provide a brief two-page synopsis of their proposed project and how it related to the Australian vegetable industry investment priorities as outlined in the Australian Vegetable Industry Strategic Investment Plan 2012-2017.

An agenda containing a summary of the priorities contained in the strategic investment plan, a project ranking template and the two-page proposed project synopses were provided in advance of the meeting, allowing subgroup members to consider the issues being addressed by the proposed research.

To facilitate the process of considering and prioritising projects, a brief introductory discussion was held to refresh participants' memory of the agreed industry priorities.

Each speaker was then allocated 20 minutes to present their concept with an additional five minutes allocated to questions and general discussion.

The topics covered by the presenters were:

- Dr Thambaramala Gamage, CSIRO – Innovative Packaging Options for the Australian Vegetable Industry
- Dr Graham Brodie, University of Melbourne – Microwave Management of Weeds
- Mr Sam Birrell, Netafim – Permanent Re-use of Drip Irrigation in Vegetables
- Prof Salah Sukkarieh, University of Sydney – An Intelligent Farm Robot for Complete Crop and Soil Awareness
- Dr Terry Turney, Monash University – Development of Biofortified Crops within an Active Packaging Supply Chain

- Dr Roger Hellens, Plant and Food Research – Benefits from Vitamin C in crops

Following the presentations a facilitated discussion was held with members of the subgroup to prioritise projects and determine the actions needed to get research underway.

A copy of the two-page synopsis provided by each speaker and the Strategic Investment Plan summary document is contained in the Appendices.

## 5. Expected Outcomes

The facilitated discussion that followed the speaker presentations was designed to clearly articulate and recommend actions that would progress project ideas that showed the greatest potential for innovation within the industry.

In particular, the project priorities were expected to:

- Align with the priorities as identified in the Strategic Investment Plan.
- Provide guidance and actions to be undertaken to implement identified priority projects.
- Provide additional focus on the importance of technological research that advances the competitiveness of the industry.
- Encourage the funding of technological research and development that would be directly applicable to the vegetable industry.

It was requested that the presentations be linked to the industry priorities to allow growers to derive the most value.

## 6. Products

The recommendations of the forum will be used as a reference by the Vegetable IAC and Design Teams when considering funding for technological research and development projects.

Additionally, the forum identifies technologies that should be developed further through levy funded projects, while setting aside projects that are not found to be directly applicable to the industry.

The projects that were deemed to have the most applicability to long-term industry development were recommended to be advanced.

## 7. Materials and Methods

The methods for conducting the seminar are outlined below in the same format as outlined in the project submission:

### **Stage 1:**

A subgroup from the Farm Productivity Resource Use and Management (FPRU&M) Design Team will be formed to further advance the ideas and information presented at the Future Technologies Seminar 2012, for the benefit of future Research and Development (R&D). The implementation and management of project VG12705 will be subcontracted by AUSVEG to Daniel Leesong, Director of Corporate Communications. Corporate Communications role will be to facilitate the meeting on the day, make necessary meeting arrangements, create a meeting agenda approved by AUSVEG, assist the subcommittee to prioritise project ideas presented by the Future Technology speakers and write a final report using a HAL template that documents the process and outcomes. AUSVEG will continue to provide oversight throughout the duration of the project. HAL has agreed that this is appropriate.

Proposed members of the subgroup are:

- Dr Kevin Clayton-Greene
- Mr Danny De Ieso
- Mr Peter Cochrane
- Mr Richard Dickmann
- A HAL representative
  - AUSVEG Design Team Coordinator

Should any of the individuals listed above be unavailable, it is recommended that the attendees list from the 2012 Future Technologies Seminar be reviewed by AUSVEG in order to enlist other subgroup members. John Said, Jeff McSpedden, Robert Hinrichsen and Mark Kable are all possible alternatives.



**Stage 2:**

The facilitator will proceed to liaise with the subgroup and the 2012 speakers in order to determine an appropriate date and time to convene. The 2012 Future Technologies speakers were:

- Biotechnology/Genetic Modification: Dr Roger Hellens (Plant & Food Research New Zealand);
- Agricultural Nanotechnology: Dr Terry Turney (Monash University);
- Crop Processing Innovations: Dr Thambaramala Gamage (CSIRO);
- Microwave Technology: Dr Graham Brodie (University of Melbourne);
- Irrigation Technologies: Mr Sam Birrell (Netafim)
- Crop Harvesting Technologies: Mr Kevin Platz (John Deere); and
- Agricultural Robotics: Mr Salah Sukkarieh (University of Sydney).

Each presenter will be asked to present an R&D project idea and will be allocated a 20-minute speaking spot.

**Stage 3:**

The facilitator will provide each member of the FPRU&M subgroup with copies of the information and presentations from the Future Technologies Seminar (VG11024) held in May 2012 in Hobart. The facilitator will also develop a two-page briefing paper which includes a synopsis of the vegetable industry outlining the key objectives and strategic priorities for the industry from information gathered from the Vegetable Industry's Strategic Investment Plan (SIP). This will be distributed to the Future Technologies speakers in advance of the meeting with sufficient time to assist in developing their project ideas. This document will enable each speaker to focus their project ideas in a way that will align with industry priorities.

#### **Stage 4:**

Separately, each Future Technologies speaker will give the FPRU&M subgroup a 20 minute-long presentation on a potential R&D project focused on their area of expertise and the subgroup will evaluate its application and appropriateness to the vegetable industry. The purpose of the meeting is to:

- Identify and prioritise areas for further R&D, taking to account possible risks or like investment by other industries.
- Determine the process for initiating R&D in the areas identified and progress the development of project proposals by the service providers for those projects deemed worth pursuing.
- Prioritise the potential R&D projects presented by the speakers to evaluate their value to the vegetable industry. The number of projects endorsed by the subgroup is flexible (though they will aim for at least three) and will be determined by the suitability of the projects presented on the day. The presentations will focus on:
  1. How the uptake of their technology will benefit growers in tangible ways.
  2. R&D required to have the technology commercially available for growers to utilise.
  3. An outline of a R&D project which utilises their scientific area of expertise that would have tangible benefits for vegetable growers or the industry.

Speakers are requested to provide the facilitator with a two-page summary of their presentation/project idea in advance of the meeting. The facilitator will collate all documents into a dossier and distribute to subgroup members in both electronic and hardcopy formats prior to the meeting. Following each presentation, the subgroup will have time for questions and discussion.

The subgroup will review each presentation and project idea at a session in the second half of the agenda in order to prioritise R&D needs. The priority rating process is to include consideration of:

- (i) benefits to the vegetable industry;
- (ii) commercial viability;
- (iii) risks; and
- (iv) like investment already in place in other sectors of vegetable industry. The rating system is to be finalised by Corporate Communications, in conjunction with AUSVEG and HAL, and scores will be recorded after each presentation.

**Stage 5:**

The facilitator will draft a final report summarising the key outcomes from the meeting. The facilitator will summarise and prioritise the draft R&D project ideas presented by the speakers, in accordance with the discussions and sentiment of the subgroup. HAL will coordinate with those who were successful to convert their ideas into the appropriate format and input their project ideas as HAL proposals into the HAL online application system.

## 8. Results

The key focus of the forum was to identify the projects that aligned to the Strategic Investment Plan and had the greatest long-term transformational impact.

The results of the deliberations are contained in the Recommendations section below.

In summary, the projects recommended by the subgroup included:

- Development of innovative packaging solutions suitable for export markets.
- Investigating how the vegetable industry can participate in the further development of microwave technology for the management of weeds.
- Funding the research necessary for a fully automated robotic harvesting solution.
- Development of vegetable varieties that are able to be more effectively machine harvested.

## 9. Recommendations

### **Innovative Packaging Options for the Australian Vegetable Industry (CSIRO)**

The subgroup was impressed by the innovative packaging options being developed by CSIRO. In particular, the ability to use the latest packaging technologies to increase shelf life and improve presentation for export markets was of particular interest.

***Recommendation 1:*** *Further liaison to be undertaken with CSIRO to establish a vegetable product specific project focused on products customised for export markets.*

### **Microwave management of weeds (University of Melbourne)**

There was widespread support for the development of this technology; however, it was acknowledged that the research program was already well funded. It was determined that the best option for the vegetable industry would be to investigate dovetailing into the existing research program with the aim to develop a specific vegetable adaptation of this technology.

***Recommendation 2:*** *Contact existing funding bodies (GRDC) for this project and explore possible vegetable specific technology adaptation.*

### **Permanent Re-use of Drip Irrigation in Vegetables (Netafim)**

There was recognition that this technology was useful but not transformational, and was already a commercially available product.

***Recommendation 3:*** *Do not proceed with funding this project.*

### **An Intelligent Farm Robot for Complete Crop and Soil Awareness (University of Sydney)**

There was recognition that there were significant advantages to advancing this research. Particular interest was shown in adapting the existing research program to develop robotic harvesting capabilities.

The subgroup determined that this was an important research area that should be a major focus for the vegetable industry. Ultimately, the aim would be to develop a commercially viable fully automated robotic harvesting platform.

***Recommendation 4:** Liaise further with the researcher to determine the steps necessary to advance existing technology and develop a fully automated robotic harvester.*

### **Development of Biofortified Crops within an Active Packaging Supply Chain (Monash University)**

There was not an appetite to devote levy funds to the development of this project.

***Recommendation 5:** Do not proceed with this project.*

### **Benefits from Increased Vitamin C in crops? (Plant and Food Research NZ)**

There was recognition that the presenter did not propose a specific project idea, rather demonstrated what was currently being undertaken in other product categories (such as kiwi fruit).

It was determined that it would be beneficial to investigate the possibility of developing selective breeding programs to make machine harvesting possible for vegetables that are presently unable to be mechanically harvested.

It was agreed that a breeding program should be a priority and that it could potentially be tendered out as a new project.

***Recommendation 6:*** *Explore options for the development of specific breeding programs to enable robotic harvesting in crops that are not currently able to be machine harvested.*

## 10. Conclusion

The forum was successful in identifying areas of research that aligned with the Australian Vegetable Industry Strategic Investment Plan 2012-2017.

The Farm Productivity Resource Use and Management Design Team subgroup agreed unanimously on the areas of research that should be progressed.

There is some additional liaison necessary with the three identified researchers to develop their project ideas and maximise the positive impact of the research.