ACIL ALLEN CONSULTING

REPORT TO
**DEPARTMENT OF ECONOMIC DEVELOPMENT, JOBS, TRANSPORT AND RESOURCES**

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# HORTICULTURE INDUSTRY NETWORK EVALUATION

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# ACKNOWLEDGEMENTS

The evaluation team would like to acknowledge the participation of HIN members and Victorian Department of Economic Development, Jobs, Transport and Resources staff in the interviews for the evaluation.

# GLOSSARY OF TERMS

| | |
|---|---|
| ABA | Almond Board of Australia |
| APAL | Apples and Pears Australia Limited |
| APTRC | Australian Processing Tomatoes Research Council |
| ATGA | Australian Table Grape Association |
| AWIA | Australian Walnut Industry Association |
| AWRI | Australian Wine Research Institute |
| CAI | Chestnuts Australia Inc. |
| CSIRO | Commonwealth Scientific and Industrial Research Organisation |
| DPI | Victorian Department of Primary Industries |
| DEPI | Victorian Department of Environment and Primary Industries |
| DEDJTR | Victorian Department of Economic Development, Jobs, Transport and Resources (Agriculture Victoria) |
| FGV | Fruit Growers Victoria |
| HAL | Horticulture Australia Limited |
| HGA | Hazelnut Growers of Australia |
| HIA | Horticulture Innovation Australia |
| HIN | Horticulture Industry Network/Horticulture Industry Innovation Network |
| HRDC | Horticulture Research and Development Corporation |
| IDO | Industry Development Officer |
| ILO | Industry Liaison Officer |
| MVW | Murray Valley Winegrowers |
| NGIV | Nursery and Garden Industry Victoria |

| | |
|---|---|
| PGA | Pistachio Growers Association |
| PPRR | Prevention, Preparedness, Response, Recovery model |
| RABA | Raspberries and Blackberries Australia |
| SAL | Summerfruit Australia Limited |
| VCA | Victorian Cherry Association |
| VFF | Victorian Farmers Federation |
| VGA | Vegetable Growers Association of Victoria |
| VICSPA | Victorian Seed Potato Authority |

# EXECUTIVE SUMMARY

## Introduction

### The evaluation

ACIL Allen Consulting was engaged by the Department of Economic Development, Jobs, Transport and Resources (the Department) to evaluate the net benefits of the Horticulture Industry Network (HIN) (2013-14—2015-16) and the potential net benefits of the Horticulture Industry Innovation Network (HIIN) (2016-17).

The outcomes of the evaluation will inform future Department work with the horticulture industry. The evaluation was conducted over the period December 2016 to February 2017.

### The Horticulture Innovation Network

The Horticulture Industry Network (HIN) was established in 2008 by the then Department of Primary Industries (DPI) to improve connectivity and collaboration between 21 national and state temperate horticulture industry associations. A renewed HIN was initiated in July 2013, and in July 2016 the HIN was recast as the Horticulture Industry Innovation Network (HIIN) with a stronger focus on biosecurity.

For simplicity, the HIN/HIIN is referred to the 'HIN' throughout this report, unless otherwise indicated.

## Evaluation findings

*Key finding 1*

The characteristics of the horticulture industry that led to the establishment of the HIN are deep rooted, with many related to the structure of the horticulture industry and its production requirements. As such, they remain issues for the industry in Victoria.

The design and function of the HIN is unique in Australia. In particular, the focus on building the capability of industry associations to support growers, the inclusion of a wide range of industries, and the direct links and strong relationships facilitated between the HIN members and the Department, are not found elsewhere in horticulture.

*Key finding 2*

The HIN has good representation across Victoria's horticultural industries, with both state and national organisations represented. An area underrepresented is the vegetable industry, and this is a current area of action for the Department.

### *Key finding 3*

The HIN is highly valued by its members and Department staff. It provides valuable industry intelligence to the Department and HIN members, and facilitates networking within industry and stronger industry-government links. The HIN-related capacity building of industry associations is also valued, although evidence of impact in this area is harder to identify. The HIN website and social media activities have significant reach, and there is an indication that relevant stakeholders see value in these platforms.

### *Key finding 4*

HIN has provided an important linkage between industry and government on biosecurity issues. This has allowed the Department to build the capacity of industry to prepare for and respond to biosecurity events. It has also allowed collaboration between the Department and industry to develop land use maps, which have been used for emergency recovery to determine the extent of the damage and the appropriate scale of response.

### *Key finding 5*

Based on estimates of the contribution of the Victorian biosecurity system to the horticulture sector, and assuming the HIN is contributing to this system commensurate with its level of activities, the impact of HIN in this area is estimated to be around $870,000 in gross value (2014-15 to 2016-17, undiscounted).

The HIN biosecurity work is also generating environmental benefits through the reduction of biosecurity risks that could impact native flora and fauna, and flow on to biodiversity loss through associated ecological changes.

### *Key finding 6*

The HIN major grants had varied impacts, dependant on their focus. A number of grants appeared to improve grower profitability by generating a number of changes including:

- increased productivity and efficiency through improved systems
- improvement in knowledge and skills related to contemporary industry issues
- implementation of new practices across management, use of technology and horticultural techniques.

The two HIN grants able to be analysed quantitatively are estimated to have a cumulative economic impact of around $3,470,000 (undiscounted) between 2013-14 and 2019-20.

### *Key finding 7*

The cumulative estimated benefits of the HIN between 2013-14 and 2019-20 are approximately $4.6 million, compared with a program cost (to government and industry) of $4.2 million (both in present value terms). The estimated benefit-cost ratio for the HIN is 1.11. This is an estimate of the lower bound for HIN's economic benefits as the analysis only includes 48 per cent of HIN activity (by expenditure), while including all of HIN costs. If the benefits of the other components of the HIN were able to be quantified it would be expected that HIN has a greater level of economic benefits, and a higher benefit-cost ratio.

### *Key finding 8*

The HIN generates economic benefits which cannot be quantified given current data, but which are valuable. The economics' literature indicates that networks and extension activities in agriculture often yield high rates of return. The HIN has reduced search costs and likely facilitates the diffusion of ideas and technologies to HIN members from other members and from government scientists. The quicker new ideas and technologies are adopted, the earlier the impact of these ideas and technologies on grower productivity will occur.

## Recommendations

***Recommendation 1***

That responsibility for the operation of the HIN continue to reside with the Department, but that some responsibilities are devolved to industry association members to encourage greater buy-in from members. A charter of HIN membership obligations and an annual operational plan could be developed to support this process.

***Recommendation 2***

That the HIN maintains its current focus on research dissemination and avoid drifting into areas of content or training where it does not have a comparative advantage. Actions to improve links with growers should be explored, and HIN members should continue to look for opportunities to apply for funding for collaborative initiatives focused on practice change.

***Recommendation 3***

That the HIN continues to look to recruit key industry associations, including AUSVEG, to ensure the HIN has the broadest representation of horticulture industries.

***Recommendation 4***

That the opportunity to expand membership to different groups of stakeholders in the horticulture industry, including agribusiness, is explored.

***Recommendation 5***

That, to reduce the cost of the HIN to government, HIN members take on more organisational responsibility for the HIN, allowing the Department to devote fewer resources to the network.

***Recommendation 6***

That the HIN website be refreshed to improve useability and industry alignment, including by considering the forthcoming recommendations of the website research project.

***Recommendation 7***

That an impact measurement strategy be developed to define the key outcome indicators for the HIN, and to set out how additional data will be collected to measure the impact of the HIN against these indicators.

## Key research questions and corresponding analysis and findings

**TABLE ES 1** KEY RESEARCH QUESTIONS MAPPED TO ANALYSIS AND FINDINGS IN THE REPORT

| Key research question | Corresponding analysis and findings |
|---|---|
| Appropriateness | |
| 1. Is the HIN designed to meet the needs of the Victorian Government and industry? | The identified policy problem, and the needs of the Victorian Government and industry, are described in section 2.1.1, and in sections 3.1 and 3.2 in regards to biosecurity. |
| 2. Are the HIN inputs (including Government funding and industry co-funding) and activities appropriate for addressing the identified policy problem? | HIN inputs and activities and their appropriateness are described in 2.1.1, 2.3, 3.24. Section 5.2 sets out opportunities for reform of the HIN to ensure the HIN is appropriate to address the policy problem. Section 5.2.4 deals with funding arrangements |
| Effectiveness | |
| 3. Are the HIN activities and outputs producing the desired outcomes? | The HIN activities outputs are detailed in sections 2.1, 2.3, and 3.2, and in Chapter 4. |
| 4. How could the HIN programs be improved? | Section 5.2 sets out opportunities for reform of the HIN. |
| 5. How can the Department better monitor the economic performance of the HIN programs, and what are the associated data requirements and collection methods? | The approaches used in this evaluation to estimate the economic impact of the HIN are set out in sections 1.2.3, 3.3, 4.3.2, 4.4.2 and 5.1.1. A discussion of the broader economic impacts of the HIN which were not able to be quantified is provided in section 5.1.2.<br>Section 5.2.6 sets out how the Department could better measure the economic impact of the HIN, and associated data collection requirements. Sections 5.2.1 and 5.2.2 cover suggested reforms which could support this. |
| Impact | |
| 6. What are the net economic, social and environmental impacts of the HIN? | The quantifiable economic impacts of the HIN/HIIN are detailed in sections 3.3, 4.3.2, and 4.4.2. The net economic benefits are set out in 5.1.1. |
| 7. What are the likely net economic, social and environmental impacts of the HIIN? | The non-quantifiable economic impacts are described in section 5.1.2. The social impacts are discussed in sections 2.3 and 5.1.2, while the environmental impacts are detailed in Chapter 3. |
| 8. What is the sensitivity of these impacts to changes in key variables? | Sensitivity analysis of the quantifiable economic impacts of the HIN/HIIN are detailed in sections 3.3, 4.3.2, and 4.4.2. Sensitivity analysis of the net economic benefits is in section 5.1.1. |

*SOURCE: ACIL ALLEN*

# 1 INTRODUCTION: BACKGROUND AND CONTEXT TO THE HIN EVALUATION

## 1.1 Overview

### 1.1.1 This evaluation

ACIL Allen Consulting was engaged by the Department of Economic Development, Jobs, Transport and Resources (the Department) to evaluate the net benefits of the Horticulture Industry Network (HIN) (2013-14—2015-16) and the potential net benefits of the Horticulture Industry Innovation Network (HIIN) (2016-17).

The outcomes of the evaluation will inform future Department work with the horticulture industry. The evaluation was conducted over the period December 2016 to February 2017.

### 1.1.2 The Horticulture Innovation Network

The Horticulture Industry Network (HIN) was established in 2008 by the then Department of Primary Industries (DPI) to improve connectivity and collaboration between 21 national and state temperate horticulture industry associations. A renewed HIN was initiated in July 2013, and in July 2016 the HIN was recast as the Horticulture Industry Innovation Network (HIIN) with a stronger focus on biosecurity.

For simplicity, the HIN/HIIN is referred to as the 'HIN' throughout this report, unless otherwise indicated.

### 1.1.3 Previous evaluation activities

The HIN has been evaluated a number of times since 2008. In 2010 the HIN was evaluated externally at the midpoint of its 2008-2009—2012-13 cycle, in 2014 an internal review took place, in 2015 evaluation videos were produced by the Department and in 2016 an impact report was developed for 2013-2016.

#### *2010 HIN Midterm Evaluation*

The 2010 Midterm Evaluation was undertaken by p2p business solutions and concluded that the HIN Program successfully delivered against the 'Better services to Farmers' strategy[1]. The evaluation found that the HIN provided industry with a mechanism to deliver more targeted and relevant services based on identified industry needs.

[1] 'Better services to Farmers' was a new service delivery model with an emphasis on 'public and private service providers working cooperatively to deliver better targeted, more accessible and relevant products and services'.

### *2014 HIN Review*

In 2014, three Department staff members published a review of the HIN's model for capability building and collaboration in the International Society for Horticultural Science' journal *Acta Hort*. The review notes that the HIN has established a 'formal, regular and focused opportunity for networking and collaborating' for members which 'enables the industries to work together on a range of common issues; learn from each other's experiences; and achieve agreed outcomes.'

### *2015 HIN Evaluation videos*

In 2015, HIN members were interviewed by the Department on the benefits and impacts of the HIN, resulting in two 13 minute videos (available on YouTube). The videos highlighted the trust and camaraderie between industry members built-up over the HIN's years of operation.

### *2013-2016 HIN Impact Report*

The Impact Report covers three years of the HIN, and notes that over this period members formed new connections with 63 researchers, 22 innovative businesses and 38 other government personnel. This resulted in collaborative cross-industry projects and successful applications for joint industry/ researcher funding.

## 1.2 Evaluation method

The evaluation has three areas of research:

— *Appropriateness*—to examine the suitability of the HIN and possibilities around future design of the HIN.

— *Effectiveness*—to examine how the HIN activities have translated into outputs and outcomes.

— *Impact*—to establish the economic impact of the HIN.

Within the three research areas, there are a number of key research questions (Table 1.1), which are mapped to the analysis in this report in Table ES 1.

**TABLE 1.1** KEY RESEARCH QUESTIONS

| |
|---|
| Appropriateness |
| 1. Is the HIN designed to meet the needs of the Victorian Government and industry? |
| 2. Are the HIN inputs (including Government funding and industry co-funding) and activities appropriate for addressing the identified policy problem? |
| Effectiveness |
| 3. Are the HIN activities and outputs producing the desired outcomes? |
| 4. How could the HIN programs be improved? |
| 5. How can the Department better monitor the economic performance of the HIN programs, and what are the associated data requirements and collection methods? |
| Impact |
| 6. What are the net economic, social and environmental impacts of the HIN? |
| 7. What are the likely net economic, social and environmental impacts of the HIIN? |
| 8. What is the sensitivity of these impacts to changes in key variables? |

*SOURCE: ACIL ALLEN CONSULTING*

The evaluation method had three key components:

— document review

— consultations

— economic impact analysis.

Each of these is discussed below.

### 1.2.1 Document review

The document review analysed all of Agriculture Victoria's project proposals, agreements, milestone and final reports on the HIN undertaken to date, including those related to the new HIIN, previous evaluation reports, and HIN grant reports. The document review established the programs' administrative and operational architecture, the activities funded by the programs, how they have developed over time, and how the programs are assisting the horticulture industry to build its capacity.

### 1.2.2 Consultations

Consultations included interviews with the five industry associations that received major grants under the HIN, group discussions with the other HIN members, and interviews with Department staff (a full consultation list is provided in Appendix B). The consultations focused on the quantification of the impact of the HIN, qualitative outcome information and sought stakeholder views on how the HIN could be improved and be better monitored in the future.

This consultation approach ensured that all HIN members were consulted, and that key Department staff were able to provide input on the impact of the HIN. The sample did not include growers as they are unlikely to know of the HIN or be able to distinguish HIN projects/networking from other extension activities. (In some ways this is to be expected as the HIN is primarily focused on building the capacity of industry associations, and through the associations, impacting farmers; as opposed to working with farmers directly—this is discussed further in sections 2.1, 2.3, 5.1 and 5.2.)

### 1.2.3 Economic impact analysis

In order to establish the economic impact of the HIN, the HIN activities were reviewed to establish which activities' outcomes were able to be quantified in economic terms. An important input into this process was the interviews with HIN members and Department staff, where the possibility of quantifying outcomes was discussed.

It was determined that the economic impacts of two of the HIN grant projects and the HIN activities related to biosecurity were able to be quantified. Together, these HIN components account for 48 per cent of expenditure under the HIN (and 40 per cent of government funding for the HIN). Interviewees indicated that the outcomes of the remaining HIN components—three grant projects, and the non-biosecurity related network activities—were not able to be quantified[2], and so their likely economic impact is discussed qualitatively.

Data for the economic impact analysis was collected from publically available literature (such as that on biosecurity risks), from the HIN reporting (primarily the two grant reports), and from interviewees in consultations for the evaluation. Economic data on the relevant HIN components is limited, as farm level output and productivity data are rarely available, and it is challenging to quantify the potential impact of the events the HIN is working to address, for example a biosecurity incident.

As a result the analysis required assumptions to be made on the economic impact of the problems HIN is seeking to address, and on the impact of the HIN on these problems. Assumptions used in the analysis are based on the consultations and relevant literature, and are clearly specified in this report. Sensitivity analysis was also undertaken to test the robustness of the results to changes in key assumptions.

The quantitative economic benefits of the relevant HIN components were summed to arrive at an overall 'lower bound' for the economic benefits of the HIN. This figure was compared with the cost of relevant HIN components, to arrive at a net benefit result and benefit-cost ratio. Future benefits were discounted using appropriate discount rates.

It should be emphasised that the economic benefit determined through the evaluation is an estimate of the lower bound as the analysis only includes 48 per cent of HIN activity (by expenditure), while including all of the HIN costs. If the benefits of the other components of the HIN were able to be

[2] Interviewees were asked explicitly whether the outcomes of the HIN components were able to be quantified.

quantified it would be expected that the HIN has a greater level of economic benefits, and a higher benefit-cost ratio.

## 1.3 The structure of this report

The remainder of this report is structured as follows:

— Chapter 2: HIN activities
— Chapter 3: HIN, biosecurity and emergency management
— Chapter 4: HIN major grants—activities and impact
— Chapter 5: Reforming HIN—opportunities and challenges.

The report also has two appendices:

— Appendix A—Evaluation research questions
— Appendix B—Consultation stakeholder list.

# 2 HIN STRUCTURE AND ACTIVITIES

## 2.1 The structure and history of the Horticulture Industry Network

### 2.1.1 Overview of the Horticulture Industry Network

The HIN is a Victorian network of 21 national and Victorian temperate horticulture industry association members. The HIN is facilitated by the Farm Services Horticulture team in Agriculture Victoria, a part of the Department. After being established in 2008, a renewed HIN was initiated in July 2013, and in July 2016 the HIN was recast as the HIIN with a stronger focus on biosecurity.

The HIN has three main activities:

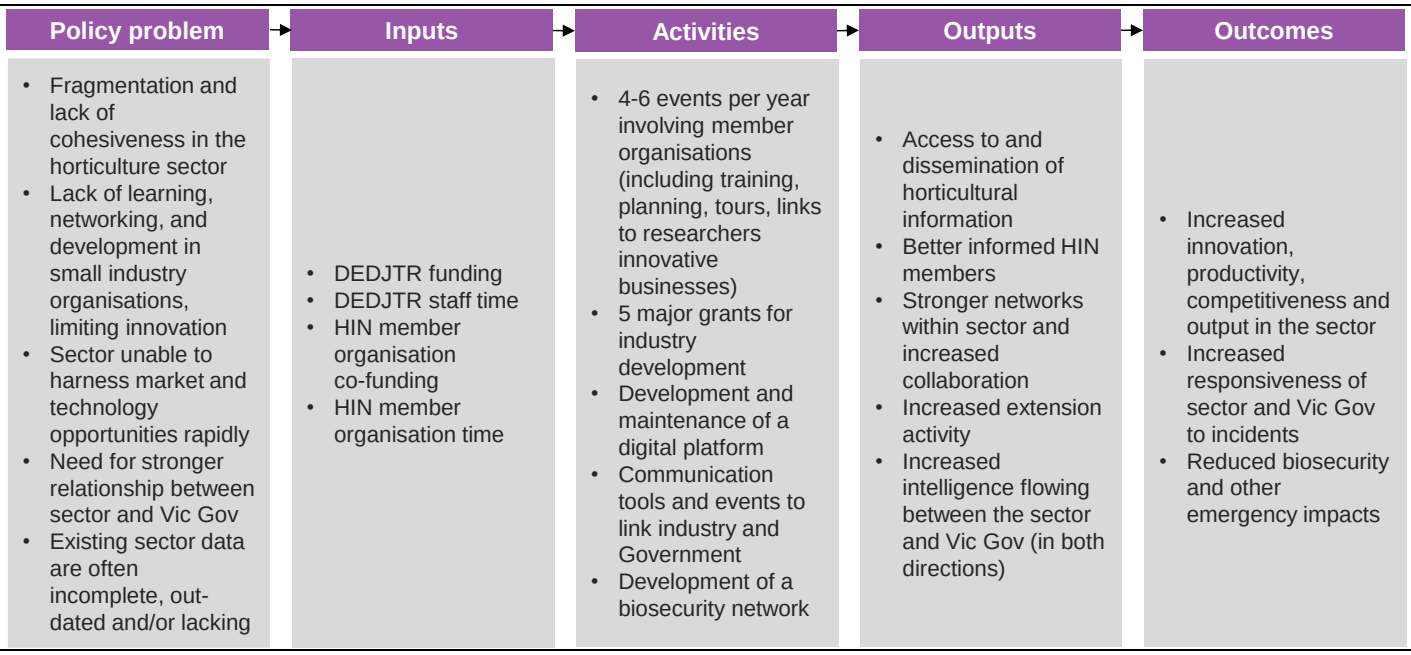
- network meetings, events and training (for which member organisations are reimbursed for their travel costs)
- major grants to industry associations (there were five major grants over 2013-14—2015-16, and none in 2016-17)
- development and management of the HIN website (including educational videos and social media).

#### A Horticulture Industry Network logic model

The logic model for the HIN sets out what the program is trying to achieve, how it aims to achieve this, and its intended impacts (Figure 2.1). The logic model is based on the 2012-2016 HIN project plan and the 2016-2017 HIIN project plan. It has five components:

- Policy problem: the issue/s the program has been designed to address
- Inputs: the resources used to operate the program
- Activities: processes, tools, events, technology and actions integral to program implementation
- Outputs: direct products of program activities
- Outcomes: such as changes in awareness, knowledge, skills, and attitude behaviour, and longer-term outcomes such as economic, environmental and social impacts.

**FIGURE 2.1** HIN LOGIC MODEL




*SOURCE: ACIL ALLEN, BASED ON DEDJTR HIN PROJECT PLANS*

Prior to the establishment of the HIN, the Department identified that the horticulture industry in Victoria was fragmented, consisting of a wide range of diverse and often small industry groups, which limited communication and cohesiveness in the industry and could slow the industry's responses to market signals. It was also noted that access to comprehensive information is required by both industry and government to ensure that the sector is able to share innovation and best practice, and leverage opportunities, but that this access was not readily available.

Horticulture Innovation Australia (HIA) (2015) has also outlined a number of key capacity challenges facing the horticulture industry, including:

— limited access to and uptake of formal leadership and professional development programs

— insufficient knowledge sharing

— limited awareness of and access to domestic and global best practice.

The context for the establishment of the HIN is also discussed in Box 2.1. The various activities undertaken through the HIN (discussed in section 2.3) aim to address these issues.

The characteristics of the horticulture industry that led to the establishment of the HIN are deep-rooted, with many inherently related to the structure of the horticulture industry and its production requirements. As such, they remain issues for the industry in Victoria. The extent to which the HIN has been able to address these issues is discussed in the remainder of this report.

### Horticulture Industry Network funding

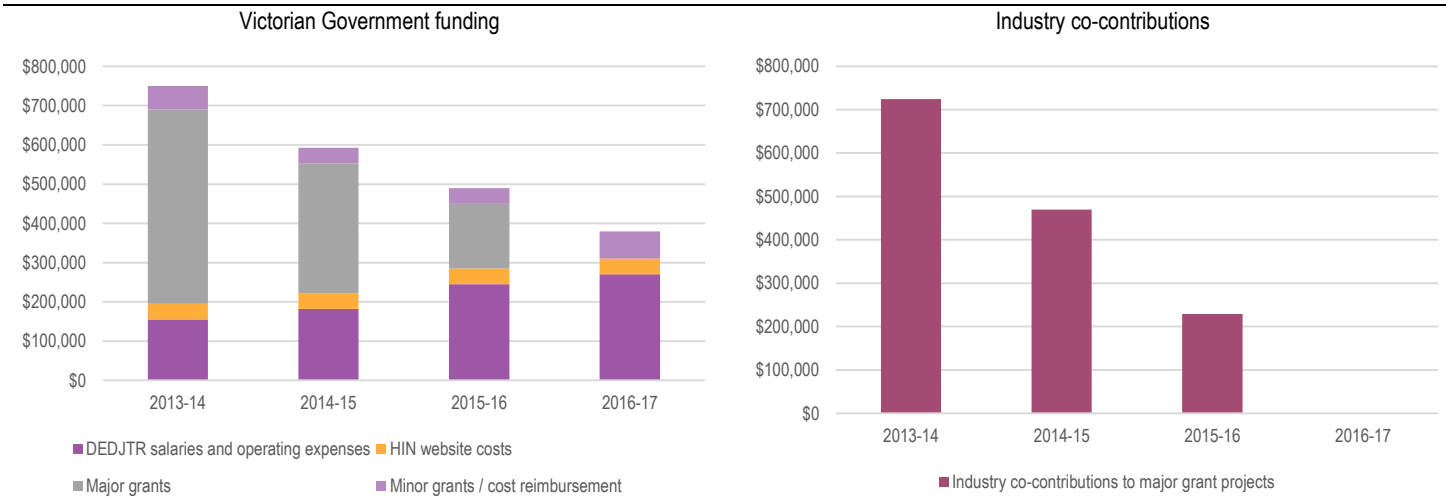
Over 2013-14—2016-17, the HIN received funding of $2.1 million from the Victorian Government. The five major grants accounted for 45 per cent of this funding, with Department salaries and operating expenses responsible for 39 per cent of costs. Website costs are estimated by the Department to be $40,000 per year (7 per cent over the period), with minor grants / member cost reimbursement accounting for the remaining 9 per cent of funding.

Industry contributions to the major grant projects totalled $1.4 million over the period—for a 1.4:1 industry-government contribution ratio (Figure 2.2).

Government funding for the HIN has fallen each year since 2013-14, primarily due to the cessation of the major grants. Website and minor grants / member cost reimbursement expenses have remained

steady, while Department salaries and operating expenses have increased as the HIN has focused more on biosecurity, involving more Department staff time.

**FIGURE 2.2** GOVERNMENT FUNDING AND INDUSTRY CO-CONTRIBUTIONS




*SOURCE: ACIL ALLEN ANALYSIS OF DEPARTMENT HIN BUDGET DATA*

### 2.1.2 History of the Horticulture Industry Network

The HIN was established in 2008 by the then DPI Victoria[3] to improve connectivity and collaboration between 21 national and Victorian temperate horticulture industry associations. The network's establishment was part of the Victorian Government's *Future Farming Strategy* (2011), which aimed to 'develop the capacity of Victorian farm business to become more productive, competitive and sustainable'.

Prior to the establishment of HIN, there were limited opportunities for the horticulture industry to collaborate, share information and innovations, and to find and establish appropriate links with government (see Box 2.1 for further context). Furthermore, the Victorian Government had limited access to real-time intelligence on the horticulture industry.

The HIN was designed to address these key challenges which impact on the industry's ability to innovate:

1. Limited access to and uptake of formal leadership and professional development programs
2. Insufficient knowledge sharing
3. Limited awareness of and access to domestic and global best practice.

The HIN addresses these challenges by aiming to:

- enable cross-horticulture industry collaboration
- improve horticulture industry capability
- accelerate practice change
- provide an efficient and effective link between horticultural industries and the Department.

A renewed HIN was initiated in July 2013 which aimed to build on the first iteration of the HIN, including through the development of online tools. In July 2016 the HIN was recast as the HIIN with the same membership and activities, but with a stronger focus on biosecurity.

[3] The name of the Victorian Government Department responsible for the HIN has changed over the course of the network from Department of Primary Industries (DPI) to Department of Environment and Primary Industries (DEPI) and, currently Department of Economic Development, Jobs, Transport and Resources (DEDJTR) within which Agriculture Victoria sits.

**BOX 2.1** CONTEXT FOR THE ESTABLISHMENT OF THE HORTICULTURE INDUSTRY NETWORK

Extension, the application of research to horticultural practices through farmer education, is an important step in allowing industry to improve efficiency and productivity by implementing new practices. The small, and often geographically dispersed, nature of growers and producers presents challenges for translating research into practice. To respond to this challenge, extension activities often involve communication and education through direct industry engagement. The responsibility for horticultural extension falls both to industry and government, resulting in the employment of industry development officers (IDOs) to fill this purpose.

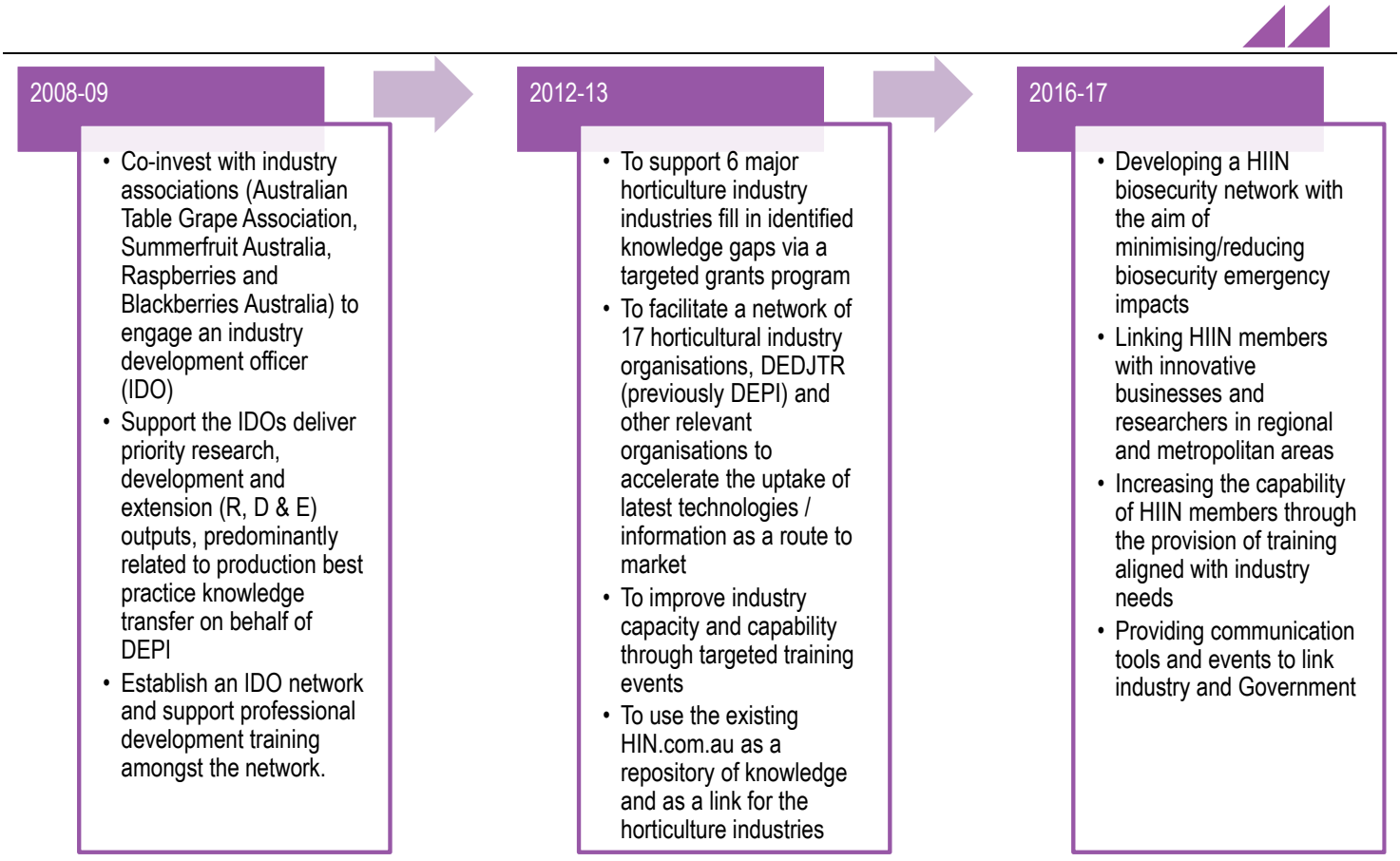
In recent times, the agencies within the Australian horticulture industry have changed and evolved, taking a number of different forms. The Horticulture Research and Development Corporation, formed in the early 1990s, merged with the Australian Horticulture Corporation to form Horticulture Australia Limited (HAL) in 2001. HAL later became HIA in 2014. These bodies all provided research, development and extension activities, in some form or another. Alongside industry changes, government activities and priorities also shifted. Historically, the state governments had provided research, development and extension activities through the funding of researchers, research programs and IDOs.

In recent years, the HIA reduced funding for IDOs to undertake extension activities. The Victorian Government also reduced the number of internal researchers and no longer employs extension staff. This created a gap in the communication and translation of research findings into horticultural practice, which impacted on innovation and business management. The then Department of Primary Industries established the Horticulture Industry Network (HIN) in 2008, in part, to address this gap.

*SOURCE: ACIL ALLEN CONSULTING*

Over the HIN's three iterations, the focus of the program has shifted slightly but it has maintained an emphasis on building capability of members, and developing links between HIN members, and between HIN members and the Department (see Figure 2.3).

**FIGURE 2.3** EVOLUTION OF THE HORTICULTURE INDUSTRY NETWORK




*SOURCE: ACIL ALLEN, BASED ON DEPARTMENT HIN PROJECT*

### 2.1.3 Horticultural networks across Australia

The design and function of the HIN is unique in Australia. In particular, the focus on building the capability of industry associations to support growers, the inclusion of a wide range of industries, and the direct links and strong relationships facilitated between the HIN members and the Department, are not found elsewhere in horticulture. Several stakeholders commented on this during consultations, and it is reflected in the membership of the HIN, with some national organisations participating, and with participation of relevant Department staff in NSW and South Australia at times.

There are various network initiatives in the horticulture industry at the national level, but these have different focuses and functions, and are aimed at different sections of the industry. For example, the National Vegetable Extension Network, commissioned by HIA, facilitates the communication of research-related information directly from IDOs to growers. The National Horticultural Research Network provides a forum for senior horticultural research and development representatives from government, the Australian Council of Deans of Agriculture, and HIA, to inform research strategy and programs at the national level.

Lobbying and advocacy activities for the horticulture industry are undertaken by various groups, including farming organisations at a state and national level (for example, the Victorian Farmers Federation (VFF), vegetablesWA in Western Australia, Growcom in Queensland and the National Farmers Federation), as well as through The Voice of Horticulture, a membership-based organisation for industry associations that was established in 2015.

There are also network groups for specific horticulture industry sectors, such as the Australian Nut Industry Council, but the focus of such groups is narrower and in many cases these groups operate on an 'as needed' basis rather than in the structured way of the HIN.

**KEY FINDING 1**

The characteristics of the horticulture industry that led to the establishment of the HIN are deep rooted, with many related to the structure of the horticulture industry and its production requirements. As such, they remain issues for the industry in Victoria.

The design and function of the HIN is unique in Australia. In particular, the focus on building the capability of industry associations to support growers, the inclusion of a wide range of industries, and the direct links and strong relationships facilitated between the HIN members and the Department, are not found elsewhere in horticulture.

## 2.2 Horticulture Industry Network members

### 2.2.1 Horticulture Industry Network membership

HIN membership is comprised of both state and national horticulture industry associations with significant production in Victoria (refer to section 2.2.2 for an overview of the Victorian horticulture industry). The current membership list is set out in Table 2.1 (recipients of major grants are bolded and recipients of minor grants are italicised). Membership of the HIN does not require a fee to be paid; the only contribution required is members' time.

**TABLE 2.1** HIN MEMBER ORGANISATIONS 2013-2016

| National industry associations | Victorian industry associations |
|---|---|
| **Australian Table Grape Association (ATGA)** | *Victorian Farmers Federation (VFF) Cut Flowers* |
| **Almond Board of Australia (ABA)** | *Nursery and Garden Industry Victoria (NGIV)* |
| *Raspberries and Blackberries Australia (RABA)* | **Vegetable Growers Association of Victoria (VGA) (now AUSVEG Victoria)** |
| Apples and Pears Australia Limited (APAL) | **Fruit Growers Victoria (FGV)** |
| *Dried Fruits Australia (DFA)* | Swan Hill Summer Fruits Development Association |
| *Australian Processing Tomatoes Research Council (APTRC)* | *Victorian Strawberry Industry Development Committee* |
| Pistachio Growers Association (PGA) | *Victorian Cherry Association* |
| Australian Walnut Industry Association (AWIA) | Victorian Seed Potato Authority (VICSPA) |
| Hazelnut Growers of Australia (HGA) | *Murray Valley Winegrowers (MVW)* |
| Chestnuts Australia Inc. (CAI) | |
| **Australian Wine Research Institute (AWRI)** | |
| Summerfruit Australia Limited (SAL) | |

*SOURCE: ACIL ALLEN, BASED ON DEDJTR HIN PROJECT DOCUMENTATION*

As membership is at the organisational level, each organisation is free to decide which of their staff will participate in the HIN. For the majority of organisations, the participant is the Executive Officer or Industry Development Officer, although in other cases the participant is another staff member (for example, the AWRI representative is the Extension Services Manager). There may be overlap between representatives; for example, the Pistachio Growers Association, the Australian Walnut Industry Association, Hazelnut Growers of Australia and Chestnuts Australia Inc. are represented by a single person. Board members from some HIN member organisations have also attended some meetings.

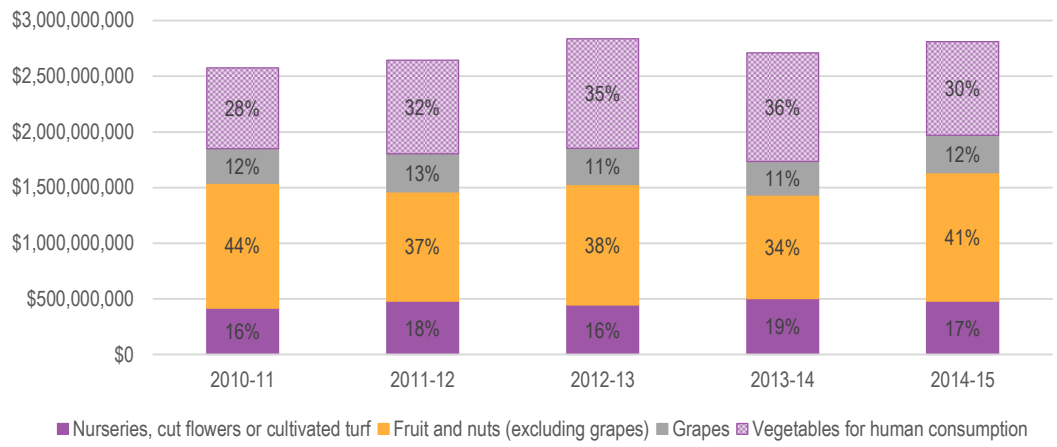
The majority of organisations and representatives are based in Victoria, although several national organisations or their representatives are based interstate. For example, the primary representatives

for the Almond Board of Australia and the Pistachio Growers Association are based in South Australia, and Raspberries and Blackberries Australia is headquartered in New South Wales.

### 2.2.2 The horticulture sector and Horticulture Industry Network members

The gross value of production of the Victorian horticulture sector in 2014-15[4] was $2.8 billion, up 4 per cent from the year prior, although still below the peak in 2012-13. Fruits and nuts (excluding grapes) accounted for 41 per cent of the sector in 2014-15, with vegetables for human consumption responsible for 30 per cent of gross value of production.

**FIGURE 2.4** HORTICULTURE INDUSTRY GROSS VALUE OF PRODUCTION, 2010-11—2014-15




Note: Gross value is in nominal dollars.

*SOURCE: ABS 7503.0 - VALUE OF AGRICULTURAL COMMODITIES PRODUCED, AUSTRALIA, MULTIPLE YEARS*

Ensuring comprehensive representation of all major horticultural industries in Victoria is particularly important, given the HIN's current focus on biosecurity. Biosecurity risk management and information sharing benefits from the network will be maximised if all industries are represented. Most horticulture sectors are currently represented in the HIN. Table 2.2 provides a further breakdown of the Victorian horticulture industry, and matches HIN members with ABS classified subsectors.

Since the Vegetable Growers Association was succeeded by AUSVEG VIC in late 2015, the vegetable industry has not been represented. Given the size of the industry's contribution to the horticulture sector, this is a significant gap in the current network. The Department is currently encouraging AUSVEG VIC to become a member of the HIN.

Additionally, the turf industry is not currently represented in the HIN, although the nurseries and cut flowers sectors are. The representative from NGIV is also the Industry Development Officer for Turf Victoria, so the opportunity exists to expand membership to Turf Victoria. This would be similar to the current representation of PGA, AWIA, HGA and CAI by one individual.

[4] The latest year for which data are available.

**TABLE 2.2** HORTICULTURE INDUSTRY IN VICTORIA, 2014-15

| Sector | Subsector | Value (2014-15) | Share | HIN representatives |
|---|---|---|---|---|
| Nurseries, cut flowers or cultivated turf | Nurseries, cut flowers or cultivated turf | $480,137,713 | 17% | Nursery and Garden Industry Victoria (NGIV)<br>Victorian Farmers Federation (VFF) Cut Flowers |
| Fruit and nuts (excluding grapes) | Apples | $249,914,951 | 9% | Apples and Pears Australia Limited (APAL)<br>Fruit Growers Victoria (FGV) |
| | Pears (including Nashi) | $106,093,272 | 4% | |
| | Cherries | $78,090,586 | 3% | Victorian Cherry Association |
| | Nectarines | $58,796,140 | 2% | Swan Hill Summer Fruits Development Association<br>Summerfruit Australia Limited (SAL)<br>Fruit Growers Victoria (FGV) |
| | Peaches | $40,159,155 | 1% | |
| | Other stone fruit | $26,979,032 | 1% | |
| | Strawberries | $91,781,453 | 3% | Victorian Strawberry Industry Development Committee |
| | Other fruit | $96,934,045 | 3% | Raspberries and Blackberries Australia (RABA) |
| | Almonds | $401,617,041 | 14% | Almond Board of Australia (ABA) |
| | Other nuts | $2,584,239 | <1% | Pistachio Growers Association (PGA)<br>Australian Walnut Industry Association (AWIA)<br>Hazelnut Growers of Australia (HGA)<br>Chestnuts Australia Inc. (CAI) |
| Grapes | Grapes - wine production | $122,068,806 | 4% | Australian Wine Research Institute (AWRI)<br>Murray Valley Winegrowers (MVW) |
| | Grapes - all other uses | $213,821,921 | 8% | Australian Table Grape Association (ATGA) |
| Vegetables for human consumption | Potatoes | $119,897,372 | 4% | Victorian Seed Potato Authority (VicSPA) |
| | Tomatoes | $87,260,889 | 3% | Australian Processing Tomatoes Research Council (APTRC) |
| | Other vegetables | $633,987,315 | 23% | [formerly Vegetable Growers Association of Victoria (VGA)] |

Note: Value is gross value of production and in nominal dollars.

*SOURCE: ACIL ALLEN, BASED ON DEDJTR HIN PROJECT DOCUMENTATION AND ABS 7503.0 - VALUE OF AGRICULTURAL COMMODITIES PRODUCED, AUSTRALIA, 2014-15*

**KEY FINDING 2**

The HIN has good representation across Victoria's horticultural industries, with both state and national organisations represented. An area underrepresented is the vegetable industry, and this is a current area of action for the Department.

## 2.3 Horticulture Industry Network activities

This section covers HIN activities, except those related to the major grants (see Chapter 4). Biosecurity and emergency management activities are discussed in greater detailed in Chapter 3.

A number of HIN activities occur through HIN meetings. A total of 20 HIN meetings are expected to take place over 2013-14—2016-17, with an average of 11 industry associations attending each meeting (see Table 2.3). Meetings generally go for one or two days and take place in Victoria, with the exception of one trip to Adelaide, and two to New South Wales.

The content of meetings has varied, covering farm visits, information technology demonstrations/ training, market and port tours, and HIN planning. The most common meeting activity is sharing of Department research with HIN members and the sharing of industry information. Researchers from other organisations are also present at HIN meetings, including SARDI (South Australian Research

and Development Institute), Commonwealth Scientific and Industrial Research Organisation (CSIRO), University of Melbourne, University of Adelaide and NSW Department of Primary Industries (DPI).

**TABLE 2.3** HIN MEETINGS

| | Meetings | Average number of HIN members in attendance | Update reports |
|---|---|---|---|
| 2013-14 | 5 | 11 | 6 |
| 2014-15 | 3 | 16 | 5 |
| 2015-16 | 6 | 11 | 4 |
| 2016-17 | 6* | 10 | 2** |
| Total | 20 | 11 | 17 |

Note: * including four meetings prior to the evaluation reporting, and two meetings scheduled for the remainder of 2016-17; ** up to November 2016

*SOURCE: ACIL ALLEN ANALYSIS OF DEPARTMENT DOCUMENTATION*

The impacts of these HIN activities can be seen in:

- industry intelligence
- capacity building of industry associations
- networking within industry
- industry-government links
- HIN social and digital media.

Each of these areas is discussed below.

### 2.3.1 Industry intelligence

HIN meetings originally involved the informal sharing of information, such as season and market updates, through member networking. While this information was recorded in meeting minutes, the process was formalised following the HIN's redevelopment in 2013-14.

The current process is for industry information to be collected from HIN members and compiled by Farm Services Horticulture into a quarterly HIN Update document which is distributed to all members. The Update includes information on seasonal conditions, weather, crop production and market changes (for example, quality and price expectations), as well as other industry news and events as relevant.

The HIN Update is also distributed to Department staff from a range of teams, including Primary Industry Policy, Agricultural Research and Biosciences Research, Biosecurity, Agricultural Services and Biosecurity Operations and Trade Victoria. As at June 2016, there were over 100 recipients of the Update, across industry and the Department.

Stakeholders interviewed for this evaluation, both industry and the Department, found the Update to be valuable, noting that it provides a unique source of information on many industries.

### 2.3.2 Capacity building of industry associations

Capacity building for staff in industry associations is a key activity for the HIN. The training program is diverse including formalised training, such as the Industry Liaison Officer program, as well as less formal sessions for professional development and operational upskilling. Topics for these training sessions have included evaluation, MS Excel, electronic communication tools and social media, and commercialisation. Site tours and links with researchers, discussed below, also help to improve industry capability and awareness of latest research and best practice.

Consistent with the findings of Treeby et al. (2014), HIN members interviewed for this evaluation spoke positively of the HIN as an opportunity for personal and professional development. In many cases, individuals noted that without the HIN they would not have the time or opportunity to undertake such training, and that they learnt something new during each meeting. However, some members noted that at times it was difficult to know how to implement these learnings for the benefit of growers in their industry (refer to section 5.2.2 for further discussion of this).

### 2.3.3 Networking within industry

One of the key objectives of the HIN is to facilitate networking and cross-industry collaboration. This is done formally, through networking sessions incorporated into meeting agendas, and informally, through meal breaks and other activities such as site tours.

Stakeholders consulted for this evaluation, including HIN members and Department staff, indicated that they had received substantial benefit from the networking opportunities provided by the HIN. Numerous stakeholders noted that they would not have had the opportunity to meet the other representatives without the HIN. Several commented that they would not even have known who to meet with. One HIN member representative estimated that they would speak with another HIN member once per fortnight, on average.

HIN members also saw benefit in the opportunity to discuss common issues faced by different industries, such as occupational health and safety (OH&S) requirements and labour, agrochemicals, governance and reporting issues. The quarterly HIN Update, discussed above in section 2.3.1, was also considered to assist information-sharing about these issues.

### 2.3.4 Industry-government links

Providing 'an efficient and effective link between horticultural industries and the Department' is an objective of the HIN. This is approached in a number of ways, both formally and informally. The networking opportunities that the HIN offers, as discussed above, were seen as particularly valuable by Department staff who appreciated the unique opportunity to speak with a range of industry representatives in an informal setting, including over morning and afternoon tea during the meetings.

Many HIN meetings include presentations from Departmental researchers, as well as field or laboratory visits. In some cases, these presentations and visits have led to ongoing collaboration, such as with the land use mapping project discussed in section 3.2.

Formal links are also developed, for example, through the Industry Liaison Officer training provided for HIN members, which clearly identifies the roles of both government and industry bodies in the case of an emergency or biosecurity incident. The HIN was used as a key point of communication with growers after the severe hailstorm in north-west Victoria in November 2016 (see section 3.2).

The HIN also facilitates links between industry and government in other states, with visits to state departments and research facilities in South Australia (April 2016) and New South Wales (September 2015) having been scheduled during past meetings.

### 2.3.5 Horticulture Industry Network digital and social media

#### The Horticulture Industry Network website

The HIN website (www.hin.com.au) is Agriculture Victoria's primary means of communicating information regarding temperate Victorian and national horticultural industries to stakeholders and the public. The website is also used as a communication tool across the 'Profitable Stonefruit', 'Profitable Pear' and the Industry Professionals (HIN) networks. Additionally, the website acts as a clearinghouse for horticulture-related research, policy, grants, market or product information.

Farm Services Horticulture regularly updates the website with news, event information and resources. A regular e-newsletter is distributed to over 120 subscribers, with information about the latest additions to the website.

The website was reviewed in 2013 after an evaluation identified that it was the 'least valuable' component of the HIN and was not meeting industry needs. Issues identified with the 2013 website included the absence of unique information and the presence of less relevant content. Consultations with industry identified a demand for access to research and publications, industry newsletters, and updates on HIN projects.

The website was reconfigured in 2014, with a renewed emphasis on operating as a knowledge management hub, providing a repository of industry information and offering an accessible network

across the horticulture industry. This includes hosting project information, distributing an e-newsletter, and embedding search functionality.

The website is structured by six categories:

- Landing page: features latest blogs, quick links to resources and highlighted subjects.
- Industry and research associations: direct links to each of the HIN network's partners, including peak bodies and associations, governments, research organisations and industry stakeholders.
- Resources: provides access to diverse resources, including industry newsletters and publications, publicly accessible research articles and contemporary news items.
- Crops: technical information on growing and production, separated into 18 industry groups.
- Topics/Projects: information on current projects underway as part of the HIN.
- Events: information and links for upcoming events in the horticulture industry.

The HIN team collects website usage statistics using Google Analytics, which provides data uptake and usage. Additionally, the HIN team conducts usability testing with website users to identify the industry-related topics end-users (industry associations or service providers) 'typically look for'. Visits to the website grew 132 per cent between 2014-15 and 2015-16 to around 70,000 unique visitors. Geographically, users have predominantly been from Australia (71 per cent); however, there has been international interest from the United States (17 per cent), India, Brazil and the United Kingdom.

From 2013 to June 2016, the HIN website had 176,000 unique views, and 234,000 total page views (Department of Economic Development, Jobs, Transport and Resources 2016). Department staff interviewed for this evaluation noted that in several cases, growers had contacted Department researchers to enquire about research they had first seen on the HIN website.

The website is currently being refreshed in line with the 2016 recasting of HIN to include a renewed focus on biosecurity. The objective of the website refresh is to ensure collaboration with industry sectors in managing the web-based knowledge exchange hub.

Feedback on the HIN website received in consultations for the evaluation was mixed. Some stakeholders, including Department scientists, saw great value in the HIN as a central repository of industry-relevant horticulture research. A number of Department scientists reported receiving feedback from growers on the utility of the website in providing practical science and guidance. Conversely, some stakeholders reported finding the website difficult to navigate and reported that they did not use the website often (refer section 5.2.5 for further discussion of the HIN website).

**HIN social media**

Farm Services Victoria also administers several public social media channels for the HIN, including Facebook, Twitter, LinkedIn and YouTube.

In June 2016, the Facebook page (Horticulture Industry Network) had 2,485 followers/'likes'. As at February 2017, this had grown to 2,620 people. The Facebook page is used to share information from Agriculture Victoria, such as climate updates or upcoming webinars, as well as other relevant industry information. Updates and photos from HIN meetings and activities are published. There was also a HIN Twitter account (@hortnetwork) which was used for a similar purpose and which had around 750 followers.

The HIN YouTube channel (toolsresources) currently has 142 subscribers, and its uploaded videos have received 50,895 total views. As at February 2017, the channel had uploaded 196 videos. These include short video snapshots of HIN meetings and other activities, as well lectures and other updates from researchers. Nine videos each have over 1,000 views, including an instructional video on training walnut trees, which has over 17,200 views.

**KEY FINDING 3**

The HIN is highly valued by its members and Department staff. It provides valuable industry intelligence to the Department and HIN members, and facilitates networking within industry and stronger industry-government links. The HIN-related capacity building of industry associations is also valued, although evidence of impact in this area is harder to identify. The HIN website and social media activities have significant reach, and there is an indication that relevant stakeholders see value in these platforms.

# 3 HIN BIOSECURITY AND EMERGENCY MANAGEMENT

## 3.1 Biosecurity and emergency management

Biosecurity relates to the measures which protect communities from harmful biological or biochemical substances. Biosecurity risks such as insect pest incursion and plant disease epidemic have been identified as significant, and likely to occur in Victoria (State of Victoria, 2004).

The realisation of these risks, manifesting as biosecurity incidents, can occur as a consequence of ineffective border control and quarantine practices, natural processes (such as migration patterns and environmental conditions) and population dynamics. The impact of these incidents can range from low consequence to significantly negative, with impacts on market access, trade, production and industry resilience.

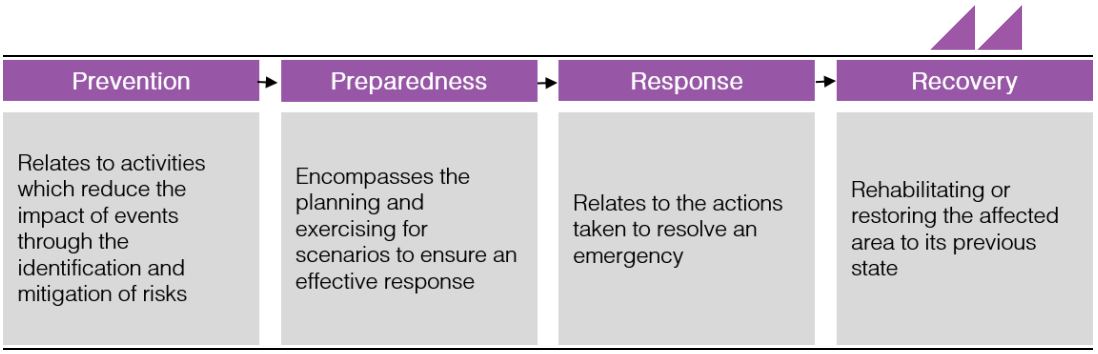
In Australia, biosecurity agencies operate under Commonwealth, state and territory legislation administered and managed by the agricultural and environmental agencies. As biosecurity incidents are a form of hazard addressed under emergency management legislation and arrangements (both Commonwealth, state and territory), the response requires a multi-agency, joined-up approach.

The multi-agency approach is also applied to natural disasters which can have similar impacts on industry. Natural disasters include bushfires, floods, severe storms, earthquakes and landslides. Like biosecurity incidents, natural disasters can have a negative impact on industry by contaminating water sources, damaging infrastructure, and destroying crops. For example, when Cyclone Larry hit Queensland in 2006, major damage was caused to infrastructure and agricultural crops. Damage was estimated at $1.5 billion for affected regions.

As a form of emergency management, mitigation of biosecurity risks is generally approached under the PPRR model (prevention, preparedness, response, recovery). Figure 3.1 shows the PPRR model and each component.

The two Ps address activities prior to the occurrence of biosecurity incidents. Preparedness is considered a whole-of-industry responsibility that requires sufficient knowledge and capability to be effective. A general lack of awareness or understanding of biosecurity risks (and their significance) was identified as a risk by the CSIRO (2014). As part of preparedness activities, the Department in conjunction with Plant Health Australia administers training and simulation exercises which ensure that the industry, and relevant stakeholders, are ready to respond to biosecurity incidents in Victoria.

**FIGURE 3.1** PPRR MODEL

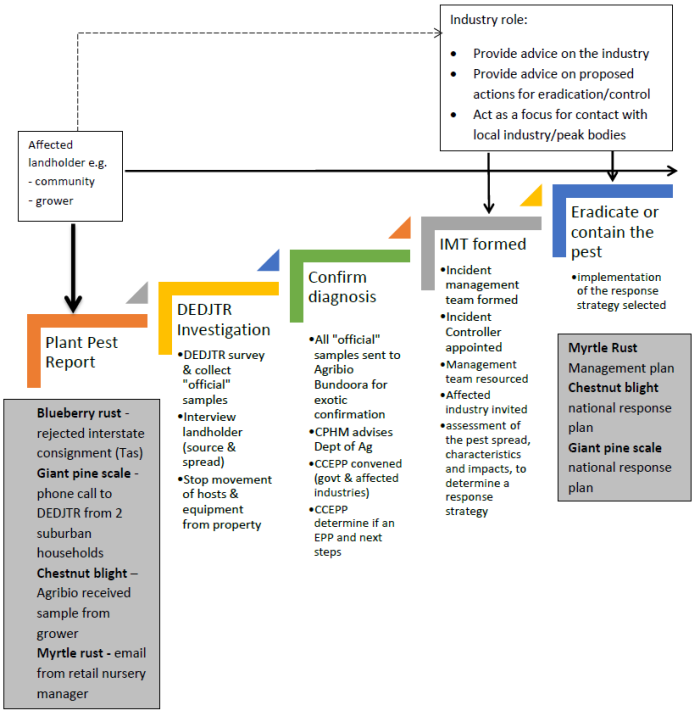



*SOURCE: ACIL ALLEN CONSULTING*

The two Rs encompass the occurrence and post-event phases of biosecurity incidents. The Victorian Department is the designated control agency for plant pests responses in Victoria and operates under the nationally agreed *Australian Emergency Plant Pest Response Plan* for plant diseases. The Emergency Plant Pest Response Deed is a formal, legally binding agreement between Plant Health Australia, the Australian Government, state and territory governments, and industry signatories.

The Department further plays a primary support role in the recovery of rural enterprises, post resolution of any biosecurity incidents. Under the Deed, all signatories have responsibilities for responding to emergency plant pest incidents. Industry input is required across the process, from pre-incursion surveillance through to eradication or containment. In particular, stakeholders noted during consultations that industry groups are important contact points between government and growers (Figure 3.2).

**FIGURE 3.2** DEPARTMENT PLANT EMERGENCY PEST RESPONSE PROCESS




*SOURCE: DEPARTMENT INDUSTRY LIAISON OFFICER PLANT EMERGENCY PEST RESPONSE TRAINING 2015*

Australia's geographical isolation has provided natural protection from biosecurity risks. However, increased international trade and travel have impacted upon the relative risks to the horticulture industry. As these trends continue, the threat posed by biosecurity risks to the horticulture industry increases.

The economic impact of natural disasters are readily identifiable. The Australian Business Roundtable for Disaster Resilience and Safer Communities (2016) found that the cost of natural disasters in Australia exceeded $9 billion in 2015. For biosecurity threats, economic impacts are generally assessed on an individual basis. For example, the banana disease Panama TR4 was discovered in Queensland in 2015. The emergency response is estimated to have cost at minimum $22 million, with a further $26 million required to eradicate the disease. The economic impacts of biosecurity threats are currently not assessed consistently within Australia, which presents challenges in understanding their risks (State of Victoria, 2004).[5]

## 3.2 HIN activities related to biosecurity and emergency management

The HIN has worked to reduce the risk of biosecurity incidents in the horticulture sector in Victoria, with a particular focus in 2016-17. Through the HIN, the Department has conducted a number of training and information sessions for horticultural industries in Victoria to raise awareness of biosecurity risks and incident response processes. A HIN meeting was held at the Department's Attwood site in August 2014, with a focus on biosecurity awareness. Department staff, including the Chief Plant Health Officer, conducted high-level sessions including:

- 'Why and how is biosecurity important?'
- 'Exotic pests – Priority ranking, economic, political and benefits to industry'
- 'Importance of exotic freedom for market access and early intervention'
- 'What is an Industry Liaison Officer (ILO) and Plant Plan?'
- 'Government Industry and Incursion Response'.

Specific biosecurity incidents and case studies were also presented, including:

- 'Chestnut blight incursion response'
- 'Endemic pests (potato cyst nematodes, Phylloxera (which feeds on grapevines), Queensland fruit fly, Mediterranean fruit fly, and Myrtle Rust) – hygiene and awareness and market access agreements and arrangements'.

Following this meeting, emergency plant pest response training was provided for HIN members in July 2015, where HIN members were trained as Industry Liaison Officers (ILOs). Sixteen industries were represented at this training session. Prior to the session, participants were asked to complete an online training module from Plant Health Australia. Attendees undertook group activities and were provided with background information on the structure and processes of an emergency plant pest response. This included training on reporting lines and where authority lies, as well as development of stakeholder communication plans for communicating with growers. Attendees also participated in a simulated emergency in the Agriculture Victoria Incident Response Centre.

Following these biosecurity awareness and training sessions, two additional HIN members—Raspberries and Blackberries Australia and Hazelnut Growers of Australia—became signatories to the Deed in 2015. As at February 2017, the following HIN members are signatories:

- Almond Board of Australia Inc.
- Apple and Pear Australia Ltd.
- Australian Processing Tomato Research Council Inc.
- Australian Table Grape Association
- AUSVEG
- Chestnuts Australia
- Dried Fruits Australia
- Hazelnut Growers of Australia
- Nursery and Garden Industry Australia Ltd.
- Raspberries and Blackberries Australia Inc.

[5] There is little agreement between the Commonwealth, States and industry regarding how economic impact should be calculated, what should be included within the calculation, and at which level the impact should extend to (for example, local, regional, state or national).

— Summerfruit Australia Ltd
— Victorian Cherry Association (through Cherry Growers of Australia Inc.).

In line with the stronger emphasis on biosecurity, developing a horticulture 'biosecurity network with the aim of minimising/reducing biosecurity emergency impacts' was a specific objective of the updated HIN. Activities to date have included meetings focused on biosecurity issues, such as the September 2016 meeting, which was centred on various aspects of biosecurity, including land mapping, industry preparedness and surveillance. An ILO training refresher session was also conducted by DEDJTR.

The forthcoming HIN meeting in May 2017 is intended to focus on biosecurity issues in depth with particular reference to exploring the issue of owner reimbursement costs, including background information, several case studies and group activities.

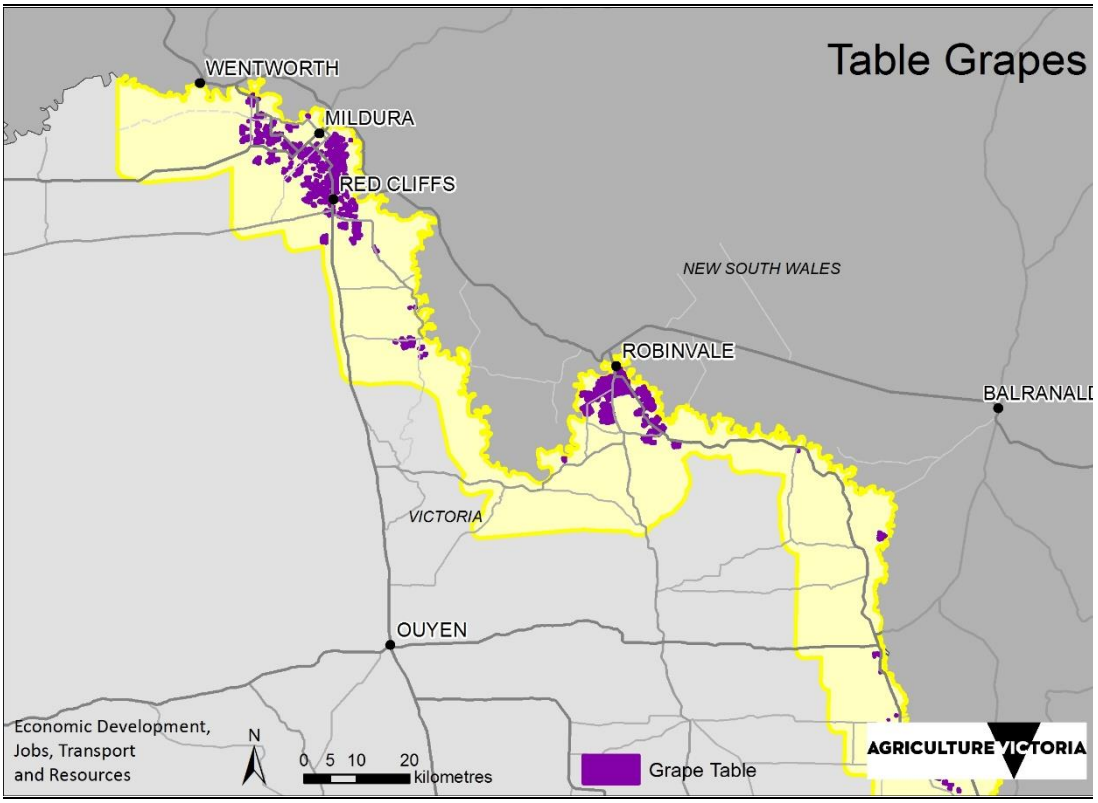
### Land use mapping

The HIN has facilitated the development of a collaborative land use mapping project between the Department and industry. Comprehensive land use maps for agricultural areas in Victoria are seen by both industry and the Department as important for biosecurity and emergency preparedness. In some areas, land use mapping is incomplete and in biosecurity emergencies, maps are essential for a speedy identification of properties that might be impacted by an incursion.

In January 2016, Agriculture Victoria researchers provided a presentation to the HIN regarding land use mapping and its uses for biosecurity and emergency risk management, particularly relating to development of a comprehensive land use mapping project for Victoria. Based on the HIN collaboration, the Department was able to put together a successful project application to the Commonwealth Government to identify land use classes from aerial images using cross validation with industry, integrating ancillary datasets and new mapping. Four horticultural industries in the Sunraysia Pest Free Area collaborated with the Department, providing time and datasets.

The maps developed to date have already been used for emergency recovery following the severe storm in north-west Victoria in late November 2016. The hailstorm caused significant damage to grapevines in the Mildura region, and land use maps (for example, Figure 3.3) were used to determine the extent of the damage and the appropriate scale of response, including the number of field staff to dispatch.

**FIGURE 3.3** MAP OF PEST FREE AREA (PFA) FOR TABLE GRAPES

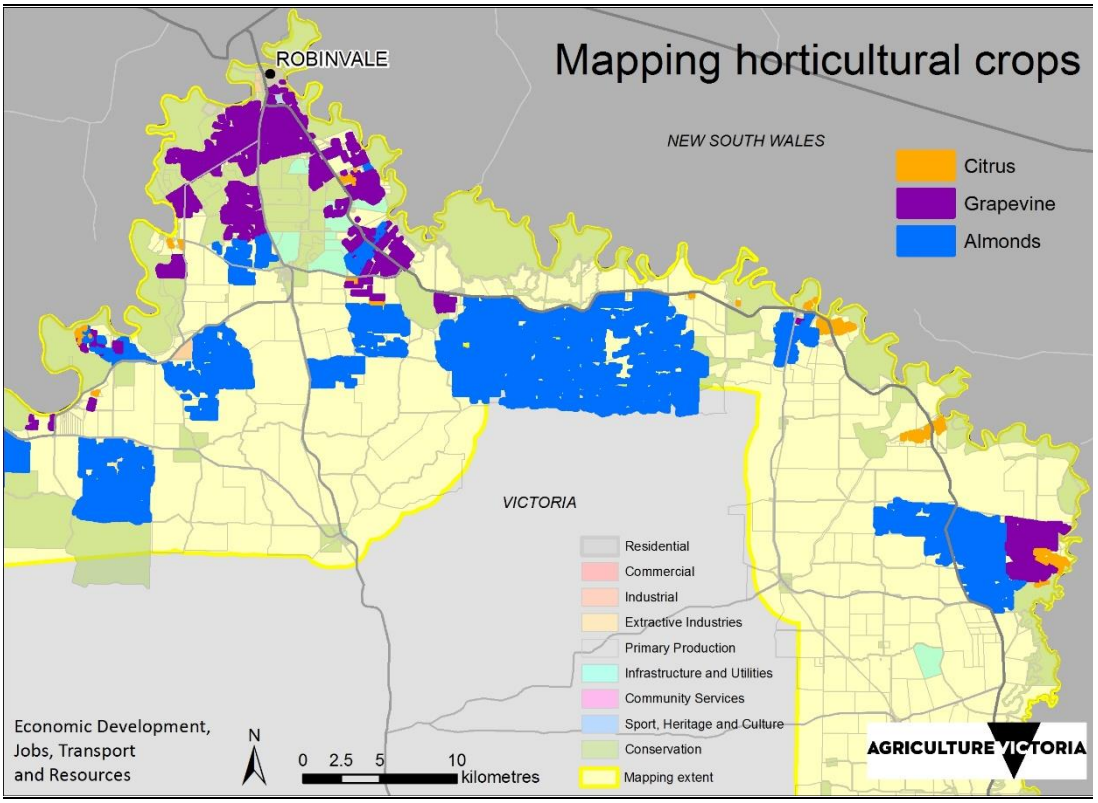



*SOURCE: DEDJTR 2017*

Stakeholders considered that it had been beneficial to engage with industry through the HIN for this project as it provided an efficient channel of communication with representatives from many industries, and it was also felt that being included in the HIN meeting agenda provided credibility to the project proposal, generating a greater level of industry engagement than they would otherwise have had.

There is interest from industry to expand the mapping project in the future, for example, through increasing the level of detail in the maps to include varietal information which could be matched to production tonnage data to inform industry supply and demand analysis. An example of a multi-commodity map is provided in Figure 3.4, with citrus, grape and almond crops mapped across the Robinvale area in northern Victoria.

**FIGURE 3.4** MAP OF HORTICULTURAL CROPS IN ROBINVALE AREA, NORTHERN VICTORIA




*SOURCE: DEDJTR 2017*

**KEY FINDING 4**

HIN has provided an important linkage between industry and government on biosecurity issues. This has allowed the Department to build the capacity of industry to prepare for and respond to biosecurity events. It has also allowed collaboration between the Department and industry to develop land use maps, which have been used for emergency recovery to determine the extent of the damage and the appropriate scale of response.

## 3.3 Economic impact of Horticulture Industry Network activities related to biosecurity and emergency management

In 2015, the Australian Bureau of Agricultural and Resources Economics and Sciences (ABARES) published a report on the value of Australia's biosecurity system at the farm gate using a case study approach. The study considered the effect on annual farm enterprise profits (or gross margins, defined as gross revenue from an activity less the variable costs incurred) of an outbreak of six potentially significant biosecurity threats to Australian agriculture: foot-and-mouth-disease, Mexican feather grass, citrus greening, highly pathogenic avian influenza, Karnal bunt and red imported fire ants.

The value of biosecurity was approximated by the on-farm costs and losses avoided as a result of biosecurity activities that target the pathways through which pests, diseases and weeds enter, become established and spread throughout Australia.

Without an effective biosecurity system, the likelihood of a pest, weed or disease incursion is expected to be significantly higher and, in the event of an incursion, pests, weeds and diseases are expected to become endemic. As a result, farm profits may be lower because of:

- direct production losses (for example, reductions in the productivity of crops and livestock and output quality)
- additional expenditures on control measures and damage mitigation (for example, additional chemical inputs)
- export market losses (for example, because of trade bans or the loss of price premiums as products are diverted to lower value markets where the pest, disease or weed is endemic).

The case study examined by ABARES that is of most relevance to this report on the HIN is the citrus greening case study.

Citrus greening or huanglongbing (HLB) is the most devastating biosecurity threat to citrus production worldwide. The vector transporting the disease is an insect called Asian citrus psyllid. Although no cure for this disease exists, it can be controlled. Citrus greening is present in Papua New Guinea and other Pacific countries. The disease is endemic in Brazil and the US state of Florida, where it took just five years to spread across all citrus production areas after its detection in 2005.

The impact of citrus greening on farm enterprise profits depends on the age of affected trees and the control method used. Citrus greening reduces the productivity of mature trees and kills young trees before they become productive. Two control strategies are available to farmers: spraying against the insect vector that carries and transmits the disease, combined with the immediate removal of the infected trees (standard control); and nutrient supplementation (which is a newer practice). In ABARES' analysis, farmers were assumed to follow the standard control strategy at a cost of $750 a hectare.

The ABARES analysis assumed that half of Australia's citrus export markets would be closed following an infestation of citrus greening and that product would be diverted to the domestic market. Using a partial equilibrium model, domestic prices were estimated to fall by around 9 per cent. The analysis assumed that lower domestic prices would be fully transmitted to farmers.

The probability of at least one event of citrus greening a year with Australia's current biosecurity system in place was estimated by ABARES using a Poisson distribution, assuming an expected incursion frequency of 0.01 (incursions are considered to occur less frequently than once in 100 years). This frequency was assumed to increase to 0.2 without the biosecurity system.

ABARES' analysis indicates that gross margins[6] would be 5 per cent or $237 per hectare lower ($4,257 per hectare compared with $4,494 per hectare) without biosecurity activities that reduce the risk of citrus greening. The ABARES study suggests that biosecurity activities have a potentially significant impact on the economic well-being of the horticultural industries in Australia.

**Potential economic value of HIN-funded biosecurity activities**

In 2014-15, the value of horticultural production in Victoria totalled $2.81 billion. Nurseries, cut flowers and cultivated turf contributed $480.1 million, followed by almonds ($401.6 million), apples ($240.9 million) and grapes for all other uses except wine production ($213.8 million).

The ABARES analysis of the impact of citrus greening implies that gross margins would be 5 per cent lower per year without Australia's biosecurity system. It is possible that the citrus greening is a particularly serious biosecurity risk, and that the average subsector of the horticulture industry faces less impactful biosecurity threats. Therefore, the below modelling reduces the biosecurity system contribution to 3 per cent, based on the ABARES analysis of other agriculture sectors, ensuring the results are a conservative lower bound.

According to the Review of the Intergovernmental Agreement on Biosecurity (2016), total government biosecurity expenditure in Australia was $650 million in 2014-15, across the $54 billion agriculture sector. Victorian horticulture accounts for around 5 per cent of the Australian agriculture sector (ABS

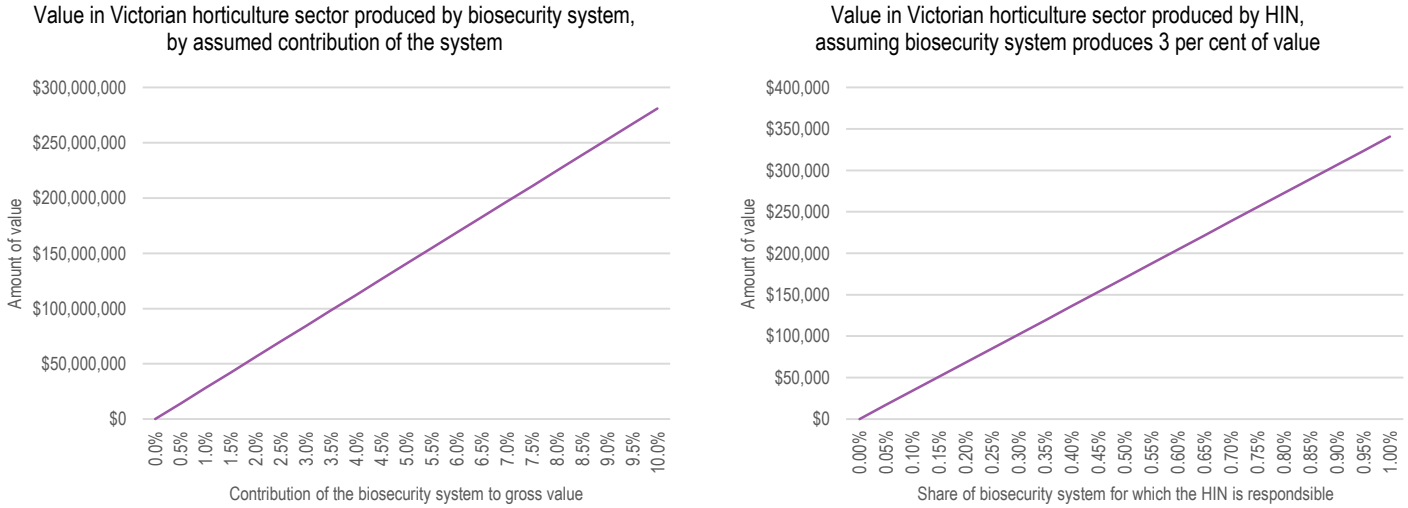
[6] ABARES defines 'gross margin' as the gross revenue derived from the enterprise less the variable costs incurred in the enterprise. This is similar to profitability, but do not include fixed or overhead costs such as depreciation or interest payments.

2016), which means, assuming an even spread of biosecurity expenditure, it accounts for approximately $34 million of government biosecurity expenditure.

The HIN biosecurity activities account for between 0.08 per cent and 0.67 per cent of this expenditure over the three key years of HIN biosecurity operations. Assuming HIN is responsible for the same share of the impact of the biosecurity system, the value of the HIN biosecurity activities can be estimated as in Table 3.1.

The two key assumptions in this analysis are the amount of Victorian horticulture sector value the biosecurity system is responsible for, and the share of this amount for which the HIN is responsible. Figure 3.5 shows the impact of changing these variables on the amount of value for which the biosecurity system and HIN account for respectively.

**FIGURE 3.5** BIOSECURITY ECONOMIC MODELLING: DEMONSTRATION OF THE IMPACT OF CHANGING KEY ASSUMPTIONS




*SOURCE: ACIL ALLEN CONSULTING*

The economic modelling results by year are set out in Table 3.1 below.

It shows the annual contribution of biosecurity system to Victorian horticulture gross value and the HIN contribution to this. The table presents sensitivity analysis through three scenarios (low, central and high cases), and the resultant contribution of HIN to gross value for the industry. The low case assumes HIN is responsible for 75 per cent of what its expenditure level would imply about its contribution to the biosecurity system, the central case 100 per cent, and the high case 125 per cent.

The cumulative (undiscounted) impact of the HIN is estimated to be $870,578 in gross value between 2014-15 and 2016-17 in the central case (low case: $652,934, high case: $1,088,223).

**TABLE 3.1** ECONOMIC IMPACT RESULTS FOR HIN BIOSECURITY ACTIVITIES

| | 2014-15 | 2015-16 | 2016-17 |
|---|---|---|---|
| Impact of biosecurity threat | | | |
| Horticulture industry gross value* | $2,810,123,930 | $2,866,326,408 | $2,923,652,936 |
| Contribution of biosecurity system to gross value | 3% | 3% | 3% |
| Contribution of biosecurity system to gross value | $84,303,718 | $85,989,792 | $87,709,588 |
| Assumed total government spending on Victorian horticulture biosecurity** | $34,062,235 | $34,743,480 | $35,438,350 |
| HIN biosecurity budget | $26,250 | $97,500 | $228,000 |
| Share of total government spending on Victorian horticulture biosecurity for which HIN is responsible | 0.08% | 0.28% | 0.64% |
| Share for which HIN is responsible*** | | | |
| Low case (75 per cent) | 0.06% | 0.21% | 0.48% |
| Central case (100 per cent) | 0.08% | 0.28% | 0.64% |
| High case (125 per cent) | 0.10% | 0.35% | 0.80% |
| HIN impact on gross value | | | |
| Low case | $48,726 | $180,984 | $423,223 |
| Central case | $64,969 | $241,312 | $564,298 |
| High case | $81,211 | $301,640 | $705,372 |

Note: *projected annual growth rate for 2015-16 to 2016-17 is 2 per cent, based on the compound annual growth rate (CAGR) of the industry over 2010-11 to 2014-15 (which was 2 per cent). (CAGR is the mean annual growth rate over a specified period of time longer than one year.) **according to the Review of the Intergovernmental Agreement on Biosecurity (2016), total government biosecurity expenditure in Australia was $650 million in 2014-15, across the $54 billion agriculture sector. Victorian horticulture accounts for around 5 per cent of the Australian agriculture sector (ABS 2016), which means, assuming an even spread of biosecurity expenditure, it accounts for approximately $34 million of government biosecurity expenditure. Growth of 2 per cent is projected based on Government expenditure trends (ABS 2016) ***the low case assumes HIN is responsible for 75 per cent of what its expenditure level would imply, the central case 100 per cent, and the high case 125 per cent.

*SOURCE: ACIL ALLEN CONSULTING*

Any biosecurity risk reduction will also generate positive environmental impacts, although a lack of data does not allow for the measuring of these environmental benefits in quantitative economic terms. Biosecurity incursions have a significant impact on the environment and on ecological systems. Invasive species and pathogens are considered to:

> *represent one of the most potent, persistent and widespread threats to Australian biodiversity. They have both a direct negative impact on species and communities through losses and extinctions and an indirect impact on ecosystems and biodiversity through ecological changes brought by those losses and extinctions.*
>
> *Assessment of Australia's Terrestrial Biodiversity 2008, Australian Government*

As an example of the impact that plant disease can have on the environment, the 2016 State of the Environment report outlines three key threatening processes related to pathogens (identified in the *Environment Protection and Biodiversity Conservation Act 1999*), including myrtle rust and the root rot pathogen. It is estimated that over one million hectares of native vegetation in Western Australia is now infected by root rot, with many hundreds of thousands of hectares in Victoria and Tasmania also infected. Myrtle rust is now established in ecosystems in New South Wales and Queensland, although more limited so far in Victoria. This pathogen is considered to be particularly damaging as its host plant family, which includes both Eucalyptus and Melaleuca is a significant part of Australian ecological systems (Jackson et al. 2017).

The HIN, through its work to build the capability of industry associations to reduce biosecurity risks, and prepare for and manage biosecurity outbreaks, is contributing to the positive environmental impact of Victoria's biosecurity system. This includes reducing risks of flora and fauna species damage and extinction, and the flow on biodiversity issues brought about through associated ecological changes.

**KEY FINDING 5**

Based on estimates of the contribution of the Victorian biosecurity system to the horticulture sector, and assuming the HIN is contributing to this system commensurate with its level of activities, the impact of HIN in this area is estimated to be around $870,000 in gross value (2014-15 to 2016-17, undiscounted).

The HIN biosecurity work is also generating environmental benefits through the reduction of biosecurity risks that could impact native flora and fauna, and flow on to biodiversity loss through associated ecological changes.

# 4 HIN MAJOR GRANTS: ACTIVITIES AND IMPACT

## 4.1 Overview of HIN major grants

As part of the HIN, a major grant was awarded to five industry associations to deliver specific projects (as summarised in Table 4.1).

**TABLE 4.1** OVERVIEW OF THE FIVE MAJOR GRANTS

| Recipient | Timeframe | Project name | Funding |
|---|---|---|---|
| Almond Board of Australia (ABA) | March 2013—June 15 2016 | Orchard management tools for benchmarking almond productivity and profitability | $150,000 (plus $150,000 industry funding) |
| Australian Table Grape Association (ATGA) | January 2013—December 2015 | Developing an Information Knowledge Management Partnership to sustain and expand international market access | $150,000 (plus $312,000 industry funding) |
| Wine Victoria (WV) and the Australian Wine Research Institute (AWRI) | Nov 2011—July 2014 | Industry Development Services and Support to the Greater Victoria grape growers and wineries | $390,000 (plus $549,000 industry) |
| Fruit Growers Victoria (FGV) | March 2013—November 2015 | Extension and orchard data collection for the Victorian apple and pear industry | $150,000 (plus $259,000 industry funding) |
| Vegetable Growers Association of Victoria (VGA) | March 2013—November 2015 | Extension Service for the Victorian Vegetable Industry | $150,000 (plus $158,000 industry funding) |

Of the five projects, four projects have completed final evaluation reports (the ABA evaluation report is pending). Each project is examined below. An economic impact analysis of the ATGA and the AWRI grants has also been carried out, and is included in the relevant section below. The other three grants are not suitable for economic impact analysis, as the link between their activities and quantifiable economic outcomes are not as direct.

## 4.2 Almond Board of Australia project

The Almond Board of Australia (ABA) is the almond industry's peak body. The ABA was formed in 2002 to replace the Australian Almond Growers Association and comprises over 250 members which represent more than 95 per cent of Australia's almond production base.

### Grant activities and outcomes

The total of the ABA grant was valued at $300,000, to be funded over the period 2013 to 2016. This included industry contribution of $150,000. The grant related to a project on the integration of OrchardNet® with research and technical information. The ABA project objectives included increasing the industry's average production figures and maintaining international competitiveness.

OrchardNet® is a subscription-based program offered by AgFirst, which collects data from growers to support crop management and maximise profits. The ABA project involved four activities, as set out in Table 4.2, together with the key desired impacts of each activity, and the key outputs in relation to each activity. The impact of the project activities is explored below.

**TABLE 4.2** ABA PROJECT ACTIVITY OUTPUTS

| Activity | Outputs | Key desired impact |
|---|---|---|
| Planning | Desktop study<br>Site visits | Identification of industry needs |
| Tool development | OrchardNet® amended to use almond terminology and key production indicators | Development of a fit-for-purpose application |
| Capability building | User manual and training video<br>Group training sessions | Increased knowledge and skills for use of OrchardNet® |
| Communications | Industry engagement<br>Distribution of newsletters<br>Orchard walks | Increased knowledge and awareness of OrchardNet® |

*SOURCE: ACIL ALLEN CONSULTING*

The implementation of the ABA project was extended until mid-2016 and, as such, the project has not been finalised. The final evaluation report is pending at the time of writing (February 2017).

## 4.3 Australian Table Grape Association project

The Australian Table Grape Association (ATGA) is the peak industry body for commercial table grape growers. The ATGA represents the interests of Australian table grape growers, processors and marketers.

### 4.3.1 Grant activities and outcomes

The total of the ATGA grant was valued at $404,800, to be funded over the period 2013 to 2015. This included industry contribution of $254,800. The grant related to the coordination of the annual registration process for new protocol markets. The ATGA project objectives included sustaining and expanding market access. The ATGA project varied considerably over the life of the project. At completion, the ATGA project focused on increasing the value and volume of exports for Australian table grape growers.

The ATGA project involved four activities, as set out in Table 4.3. The table shows the key desired impacts of each activity and the key outputs in relation to each activity. The impact of the project activities is explored below.

**TABLE 4.3** ATGA PROJECT ACTIVITY OUTPUTS

| Activity | Outputs | Key desired impact |
|---|---|---|
| Capability building | Training materials and sessions<br>Supporting tools | Educated and trained growers |
| Accreditation | Registration materials (i.e. maps)<br>Registration and compliance system | Successfully accredited growers |
| Technology | Placed on hold | Development of pest identification app |
| Knowledge sharing | Superseded by Overview of Requirements | Development of an export manual |

*SOURCE: ACIL ALLEN CONSULTING*

Measuring the full impact of the project activities is challenging as it is difficult to establish a direct link between the project activities and outcomes. For example, the value of exports for table grapes rose during the course of the project; however, this can be attributed to the opening of new markets. As a result, this section addresses the reach and significance of the activities undertaken as part of the project. The economic impact is covered below.

The education and training activities conducted as part of the ATGA project reached 250 growers, exporters and pest monitors in the table grape industry. Qualitative feedback indicates that the registration materials were well received and the online registration system improved profitability for growers and other stakeholders. From a strategic perspective, accreditation has had positive indicators as China has elected not to send inspectors since 2013.

### 4.3.2 Economic impact

The anticipated quantifiable economic impact of this project is increased production value caused by greater export volume, brought about by an increase in grower registrations (including through a reduction in the number of rejections and market suspensions). Data on export volumes to the relevant countries have been examined to estimate the impact of the project on exports.

In order to establish a counterfactual for the analysis of this project, there are two important considerations:

— The project evaluation report points out that the number of grower registrations increased over the life of the project. It is unlikely that all of this increase can be attributed to the project, as natural growth in the number of registrations may be expected.

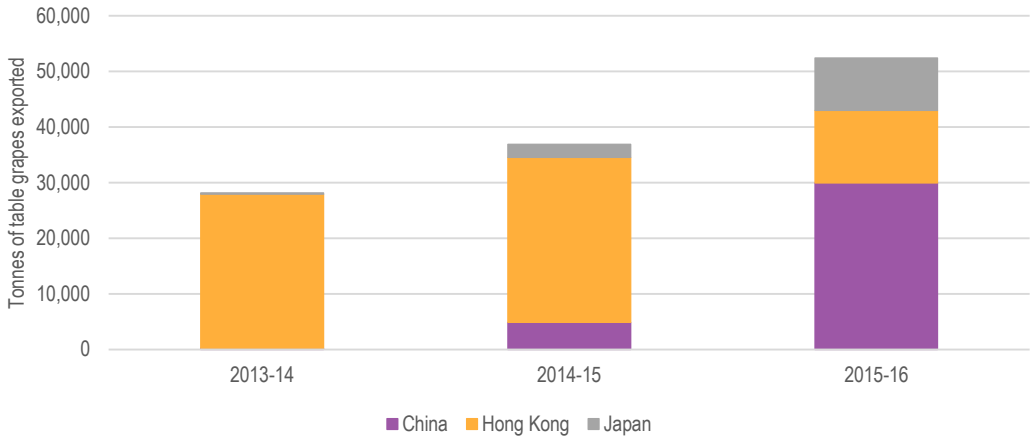
— Table grape exports to all markets, not just the markets covered by the registration, increased strongly over the life of the project. As a result, the increase in exports to China, Korea, Thailand, Vietnam and Japan (markets requiring grower registration) cannot solely be attributed to the project, and other factors such as industry growth, climate and domestic market conditions are likely to have played a role in the witnessed export growth. That is, significant export growth is likely to have occurred in the counterfactual.

Both of the factors are incorporated in the counterfactual established to estimate the additionality of the project.

ATGA data indicate that exports of Australian table grapes to Greater China (mainland China plus Hong Kong) and Japan, two markets where access is predicated on growers successfully completing the export registration process, have greatly increased in the last few years (Korea, Thailand and Vietnam are other markets with export registration and auditing protocols).

Exports to Greater China between 2013-14 (the second year after the inauguration of export registrations for mainland China) and 2015-16 increased by 15,071 tonnes, from 26,197 tonnes in 2013 to 27,907 tonnes in 2016. In Japan, exports increased from 235 tonnes in 2013-14 to 9,472 tonnes in 2015-16. The total increase in exports to these two markets between 2013-14 and 2015-16 was 24,308 tonnes (see Figure 4.1).

**FIGURE 4.1** TABLE GRAPE EXPORTS (2013-14 TO 2015-16)




Note: Years are from October to September, although most exports take place from January to June, so most exports shown in the chart, line up with the normal financial year.

*SOURCE: ACIL ALLEN ANALYSIS OF ATGA HIN REPORT AND TABLE GRAPE EXPORT AND IMPORT UPDATE - JUNE 2016*

According to the ATGA, the number of growers participating in the export registration process has increased each year, along with the proportion of those passing the audit process as they, assisted by tools refined through the HIN-funded project, became more familiar with the system and expectations of auditors (see the top half of Table 4.4).

**TABLE 4.4** REGISTRATIONS AND PASSING RATE

| | 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|
| With HIN-funded project | | | | |
| Registrations received | 150 | 175 | 196 | 209 |
| Passed | 120 | 160 | 184 | 199 |
| Passing rate | 80% | 91% | 94% | 95% |
| Failed or withdrawn | 30 | 15 | 12 | 10 |
| Failure and withdrawal rate | 20% | 9% | 6% | 5% |
| Counterfactual (without HIN-funded project) | | | | |
| Conjectured registrations received in counterfactual | 130 | 140 | 150 | 160 |
| Conjectured passing rate in the counterfactual | 55% | 60% | 65% | 70% |
| Passed (in the counterfactual) | 71.5 | 84 | 98 | 112 |

*SOURCE: ATGA (BASED ON ABS DATA), ATGA AND ACIL ALLEN CONSULTING ESTIMATES FOR COUNTERFACTUAL*

Based on insights gleaned from discussions with the ATGA, ACIL Allen has estimated the number of registrations and the passing rate that would have been achieved in the absence of the HIN-funded project (see the bottom half of Table 4.4). ACIL Allen assumed that 112 growers would have passed the audit process in 2016 in the counterfactual, which is 41 per cent lower than the 199 growers which passed the process with the help of the HIN-funded project.

ACIL Allen recognises that the HIN-funded project would most likely have been particularly instrumental in assisting smaller growers through the registration and audit process. It is therefore assumed that the average size of the growers which would have passed the audit process in the counterfactual is 50 per cent larger than the average size of the growers which passed the process with the help of the HIN-funded project.

With this adjustment, it is conservatively estimated that 15.4 per cent (that is, 100% - (112*1.5/199)*100%) of the increase in exports to Greater China and Japan in 2016 can be attributed to the HIN-funded project.

Based on an export price of $3,330 per tonne in 2016, the value of additional exports of Australian table grapes to Greater China and Japan in 2016 that can be attributed to the HIN-funded project is 15.4 per cent x $3,330 x 26,018 tonnes, a total of $10.6 million.

The figure is not the true (or marginal) impact of the HIN project however, as without the increased registrations the grapes would still have been grown and sold, likely in the domestic market and at a lower price. The export price premium is estimated at 9 per cent, based on ABARES (2015)[7].

It is expected that the value of additional exports that can be attributed to the HIN-funded project will decline over time, as the number of registrations in the counterfactual begins to catch up with that in the 'with project' case and the passing rate for audits in the counterfactual rises due to 'learning-by-doing' even in the absence of the tools refined through the project. It is also assumed that the HIN project's impact peaked in 2015-16 by which time the project has been running for a few years. This means that prior to 2015-16 and after 2015-16, the project is assumed to be responsible for a lower share of registrations.

Table 3.1 sets out the economic modelling results by year. It shows the additional exports due to the market access to China and Japan, and the share of these which are estimated to be attributable to the HIN project.

The table incorporates sensitivity analysis through three scenarios (low, central and high cases), and the resultant impact on gross value for the industry. The cumulative (undiscounted) impact of the HIN between 2013-14 and 2019-20 is estimated to be $2,096,908 in the central case (low case: $1,416,093, high case: $2,777,722).

[7] There are no data on the export premium for table grapes. ABARES (2015) estimates the impact of closure of the export market on the price of citrus products using an aggregate partial equilibrium model. It estimates the export premium at 9 per cent.

**TABLE 4.5** ECONOMIC IMPACT RESULTS FOR HIN ATGA GRANT PROJECT

| | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 | 2019-20 |
|---|---|---|---|---|---|---|---|
| Detailed central case | | | | | | | |
| Counterfactual exports* | 27,907 | 29,729 | 31,669 | 32,303 | 32,949 | 33,608 | 34,280 |
| Actual and forecast exports** | 28,142 | 36,924 | 52,450 | 53,499 | 54,569 | 55,660 | 56,774 |
| Additional exports over counterfactual | 235 | 7,196 | 20,781 | 21,196 | 21,620 | 22,053 | 22,494 |
| Average export price*** | $2,840 | $2,846 | $3,330 | $3,330 | $3,330 | $3,330 | $3,330 |
| Additional export value | $667,400 | $20,480,103 | $69,200,248 | $70,584,252 | $71,995,938 | $73,435,856 | $74,904,573 |
| Share due to HIN**** | 4.6% | 7.7% | 15.4% | 7.7% | 4.6% | 2.3% | 0.8% |
| Export premium | 9% | 9% | 9% | 9% | 9% | 9% | 9% |
| HIN impact on gross value | $2,775 | $141,927 | $959,115 | $489,149 | $299,359 | $152,673 | $51,909 |
| Sensitivity analysis | | | | | | | |
| Low case (share due to HIN) | 3.1% | 5.2% | 10.4% | 5.2% | 3.1% | 1.6% | 0.5% |
| Central case (share due to HIN) | 4.6% | 7.7% | 15.4% | 7.7% | 4.6% | 2.3% | 0.8% |
| High case (share due to HIN) | 6.1% | 10.2% | 20.4% | 10.2% | 6.1% | 3.1% | 1.0% |
| Low case | $1,874 | $95,847 | $647,714 | $330,334 | $202,165 | $103,104 | $35,055 |
| Central case | $2,775 | $141,927 | $959,115 | $489,149 | $299,359 | $152,673 | $51,909 |
| High case | $3,676 | $188,007 | $1,270,517 | $647,963 | $396,554 | $202,242 | $68,762 |

Note: *assumed annual growth rate of 7 per cent for 2013-14 to 2015-16, and 2 per cent from 2016-17 **annual growth rate of 2 per cent from 2016-17 ***price assumed to stay at 2015-16 levels ****the HIN project is assumed to be 50 per cent as impactful in 2014-15 and 2016-17, 30 per cent as impactful in 2013-14 and 2017-18, 15 per cent as impactful in 2018-19 and 5 per cent as impactful in 2019-20.

SOURCE: ACIL ALLEN

## 4.4 Australian Wine Research Institute project

The Australian Wine Research Institute (AWRI) is the Australian grape and wine industry's own research organisation. The AWRI was established in 1955 and offers a number of services, including research, a helpdesk, workshops and seminars, knowledge management, events and NATA-accredited analysis[8].

### 4.4.1 Grant activities and outcomes

The total of the AWRI grant was valued at a maximum of $939,398 to be funded over the period 2013 to 2016. This included industry contribution of $549,398. The grant related to the delivery of extension and technical outreach services to wine grape growers and wine producers in Victoria.

The AWRI project involved capability building activities across five areas, as set out in Table 4.6. The table also sets out the key desired impacts of each training activity, and the key questions that will be examined in order to quantify the economic impact of each type of activity.

[8] NATA: National Association of Testing Authorities

**TABLE 4.6** AWRI PROJECT ACTIVITY

| Activity | Outputs | Key desired impact |
|---|---|---|
| Capability building | Smoke Taint Management Factsheet<br>Workshops | Improved capability across five areas:<br>– managing grape and wine production during and post a bushfire/controlled burn<br>– adapting to climate change and variability<br>– managing quality in vineyards and wineries<br>– managing appropriate agrochemical use<br>– managing business of grape and wine production |
| Industry engagement | Seminars<br>Distribution of literature<br>Annual update of bushfire disaster plan | |
| Communications | Newsletters<br>SMS alerts | |

*SOURCE: AWRI GRANT EVALUATION REPORT*

Collectively, the extension activities reached 1,754 members of the wine grape grower and producer industry through 54 unique seminars. Qualitative feedback indicated that upwards of 90 per cent of participants found the seminars to be of above average quality or higher. Benefits were reported in terms of increased awareness of industry risks and management options, improvement in management capability and confidence, increased understanding of science and evidence, and changes to practice. The business management component of the extension activities was seen as less impactful, due to the significant level of existing business management support available to growers.

Overall, the activities were reported to upskill the industry, providing opportunities for improvement which would, in turn, improve profitability.

### 4.4.2 Economic impact

One of the key deliverables of the HIN-funded project was to improve the capacity of Greater Victorian wine grape growers and wineries to adapt to climate change and climate variability.

The extension and adoption project focused many of its resources on providing grape and wine producers in Victoria with information on how to deal with drought, salinity, extreme heat or heatwave events in the vineyard, bushfires and smoke taint, processing ripe fruit in the winery and avoiding stuck fermentations, as well as dealing with a compressed vintage and logistical pressures.

The positive impact of the HIN-funded project, and other wine grower education, on reducing the economic costs of severe climactic events may be seen in the significant heatwave that affected most of south eastern Australia between 13 and 18 January 2014. The event ranked alongside the 2009 heatwave, the 1939 heatwave and the 1908 heatwave as one of the most significant multi-day heatwaves on record (BOM 2014).

Despite the severity of the heatwave, vine damage and yield damage recorded in the 2014 season was relatively minor, particularly in comparison with the 2009 heatwave damage. There are likely a number of reasons for this, including that the heatwave occurred earlier in the growing season, but AWRI also attributes some of the difference to the work educating wine grape producers on managing vines during extended heatwave periods.

Management practices and advice that were provided to producers included:

— **Before the heat arrives**: apply irrigation to enable leaf cooling that occurs when leaves transpire; postpone any canopy manipulation (leaf removal or canopy lifting) that may increase bunch/berry exposure

— **During the heatwave**: maintain soil moisture and, if using overhead irrigation, apply at night to avoid foliage burn; as wind can cause the canopy to roll over and expose the fruit, look to implement management strategies which can reduce the likelihood of this occurring

— **After the heatwave**: irrigate to replace lost soil moisture and decrease soil temperature; monitor for pests and disease that may exploit damaged berries.

The AWRI believes that such management advice allowed producers to escape the devastating losses that were observed in 2009 when a similar heatwave hit in early February. During the 2009 heatwave, yields in the Yarra Valley were reduced by 30 to 50 per cent while 10 to 15 per cent of Pinot yields in the Mornington Peninsula were affected by the heat (Logan 2009).

In order to model the economic impact of the grant on heatwave losses, extreme heatwave frequency must be estimated. Victoria has seen five extreme heatwaves over the past 108 years (2016, 2014, 2009, 1939, and 1908), at an average of one every 21 years (BOM 2014, BOM 2016). There is also evidence that the frequency of heatwaves is increasing (Steffen et al 2014). Combining these data, it is estimated that there is a 5 per cent probability in any given year of a severe heatwave. Based on consultations with AWRI, it is estimated that such an extreme heatwave would cause a 20 per cent reduction in the value of the Victorian wine industry.

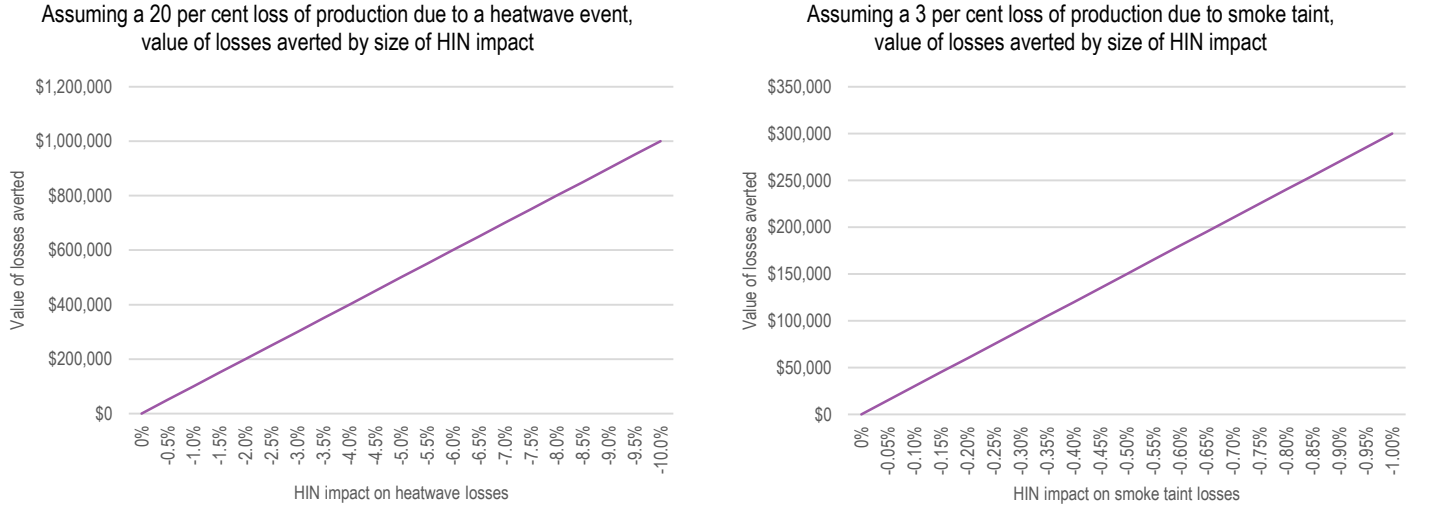
The Victorian wine industry has an economic value of approximately $1 billion per annum (Wine Victoria 2015). Based on consultations with AWRI, if the HIN-funded project has enhanced the capacity of Victorian grape growers to avoid heatwave damage to their crops so that the reduction in the value of the Victorian wine industry is reduced by 5 per cent (in the project's most impactful year) in the event of a severe heatwave, the expected benefits to the Victorian wine industry would be $0.5 million per annum.

In addition, the AWRI indicated that the wine industry has lost a total of $400 million in wine sales to smoke taint since 2003—that is, an average of approximately $30 million per annum. $30 million is the equivalent of 3 per cent of the $1 billion per annum wine industry (Wine Victoria 2015).

Based on consultations with AWRI, if it is conservatively assumed that the HIN-funded project has improved the capacity and capability of wine grape producers to manage the risk of smoke taint so that the loss in wine sales (that is, $30 million) is reduced by 0.5 per cent, the benefits to the wine industry would be in the order of $0.15 million per annum.

The impact on the two averted losses figures of changing the key assumptions is set out in Figure 4.2.

**FIGURE 4.2** AWRI GRANT ECONOMIC MODELLING: DEMONSTRATION OF THE IMPACT OF CHANGING KEY ASSUMPTIONS




*SOURCE: ACIL ALLEN*

The economic modelling results by year are set out in Table 4.7. It shows the annual expected losses from a heatwave event and from smoke taint, and the impact of the HIN on these losses. The HIN grant is assumed to be most impactful in 2015-16, with some impact in 2014-15 and 2015-16 (when the grant activities were ramping up) and in 2017-18 and 2018-19 (as the training provided previously continues to inform practice).

The table also presents sensitivity analysis for the heatwave and smoke taint modelling, through three scenarios (low, central and high cases), and the resultant impact on gross value for the industry. The

undiscounted cumulative impact of the HIN grant in regards to expected heatwave losses in between 2013-14 and 2017-18 is estimated to be $1,144,624 in the central case (low case: $686,774, high case: $1,602,473). The undiscounted cumulative impact in regards to smoke taint is $228,925 in the central case (low case: $114,462, high case: $457,849).

**TABLE 4.7** ECONOMIC IMPACT RESULTS FOR HIN AWRI GRANT

| | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 |
|---|---|---|---|---|---|
| **Impact of heatwave** | | | | | |
| Wine industry gross value* | $1,000,000,000 | $1,020,000,000 | $1,040,400,000 | $1,061,208,000 | $1,082,432,160 |
| Probability of heatwave | 5% | 5% | 5% | 5% | 5% |
| Impact of heatwave | -20% | -20% | -20% | -20% | -20% |
| Annual expected losses | -$10,000,000 | -$10,200,000 | -$10,404,000 | -$10,612,080 | -$10,824,322 |
| HIN impact on losses** | | | | | |
| Low case | -0.30% | -1.50% | -3.00% | -1.50% | -0.30% |
| Central case | -0.50% | -2.50% | -5.00% | -2.50% | -0.50% |
| High case | -0.70% | -3.50% | -7.00% | -3.50% | -0.70% |
| HIN impact on gross value | | | | | |
| Low case | $30,000 | $153,000 | $312,120 | $159,181 | $32,473 |
| Central case | $50,000 | $255,000 | $520,200 | $265,302 | $54,122 |
| High case | $70,000 | $357,000 | $728,280 | $371,423 | $75,770 |
| **Impact of smoke taint** | | | | | |
| Wine industry gross value* | $1,000,000,000 | $1,020,000,000 | $1,040,400,000 | $1,061,208,000 | $1,082,432,160 |
| Impact of smoke taint | -3% | -3% | -3% | -3% | -3% |
| Annual expected losses | -$30,000,000 | -$30,600,000 | -$31,212,000 | -$31,836,240 | -$32,472,965 |
| HIN impact on losses** | | | | | |
| Low case | -0.05% | -0.25% | -0.50% | -0.25% | -0.05% |
| Central case | -0.10% | -0.50% | -1.00% | -0.50% | -0.10% |
| High case | -0.20% | -1.00% | -2.00% | -1.00% | -0.20% |
| HIN impact on gross value | | | | | |
| Low case | $5,000 | $25,500 | $52,020 | $26,530 | $5,412 |
| Central case | $10,000 | $51,000 | $104,040 | $53,060 | $10,824 |
| High case | $20,000 | $102,000 | $208,080 | $106,121 | $21,649 |

Note: *assumed annual growth rate of 2 per cent **the HIN is assumed to be 50 per cent as impactful in 2014-15 and 2016-17, and 10 per cent as impactful in 2013-4 and 2017-18.

SOURCE: ACIL ALLEN

## 4.5 Fruit Growers Victoria project

Fruit Growers Victoria (FGV) is the peak body for the pome fruits industry in Victoria. FGV represents more than 300 fruit growing, packaging and exporting businesses across Victoria. The membership accounts for 40 per cent of Australian apple production, 30 per cent of Australia's stone fruit production and 90 per cent of Australia's pears.

### 4.5.1 Grant activities and outcomes

The total of the FGV grant was valued at $426,000, to be funded over the period 2013 to 2015. This included industry contribution of $276,100. The grant related to a project to support growers to

achieve optimal quality pack out[9] and sustainable profitability for Victorian pome fruit producers. The FGV project objectives included supporting innovation and improving the industry's competitiveness.

The FGV project involved five activities, as set out in Table 4.8. The table sets out the key desired impacts of each activity, and the key outputs in relation to each activity. The impact of the project activities is explored below.

**TABLE 4.8** FGV PROJECT ACTIVITY OUTPUTS

| Project activity | Outputs | Key desired impact |
|---|---|---|
| To lead extension of best practice to FGV audience by running three field days or workshops for growers | Two field days on Spraying Systems held with 92 attendees<br>Two field days on Managing Orchard Costs held with 40 attendees | Improved spraying practices and orchard cost management |
| Develop a young leaders program in southern Victoria | Exploration of second tier manager's discussion group as a fit-for-purpose alternative | Capacity development |
| To collect pome fruit orchard data on orchard set-up, crop estimate and actuals | 165 growers using OrchardNet®, with 27 per cent in Victoria, entering and tracking orchard data | Improved data used to inform grower management decisions |
| Develop tools for benchmark and decision support | 15 growers using GrowFruit app to plan for moth prevention and control | Improved management of moths leading to increased productivity |
| IDOs deliver two key projects, each delivering increased pack-out for industry | Two pilot projects completed: *High density block establishment*, and *Improving apple pack out* | Research to improve grower management decisions |

*SOURCE: ACIL ALLEN CONSULTING*

The diverse nature of the FGV projects generated impacts in different areas. For the field days and young leaders program, the key impact area was capability development. The field days reached 132 Victorian apple and pear growers. As the FGV represents around 300 business in Victoria, these field days are likely to have reached a substantial number of their constituents. Participant feedback indicated that the quality of the field days was high, reflecting broad satisfaction with the activity. By contrast, the young leaders program was identified as not fit-for-purpose and was not progressed—growers reported that the program's scope was too restrictive and not aligned to the industry's needs, with a number of growers reporting that it did not fit well with the target audience of 'young leaders'.

For the *OrchardNet*® and *GrowFruit* tools, the key impact area was in data usage. Case study information for *OrchardNet*® reported a significant change to business practices as a result of increased understanding of the relationships between data and business performance. *GrowFruit* is an app owned by FGV which provides analytical advice on insecticide application. The *GrowFruit* app currently has 15 users (some are individual growers, and some service a number of clients), and is being adapted to include region-wide assessment for benchmarking and prediction. The FGV project evaluation indicated that improved data could improve efficiency and productivity for growers in Victoria.

In relation to research and knowledge exchange, the two pilots undertaken contributed to the knowledge base of the sector, identifying key findings on high density block establishment and further research questions on apple pack out. The exchange of information through networking, such as the field days, was also identified as having a positive impact on the sector.

[9] Pack out refers to the total amount of a commodity that is packaged.

## 4.6 Vegetable Growers Association of Victoria project

The Vegetable Growers Association (VGA) is the peak body representing vegetable growers in the State of Victoria. VGA represented 92 vegetable growers, about one fifth of the leafy and root crop vegetable business in Victoria. VGA has since merged with AUSVEG, the industry representative body for vegetable and potato growers.

### 4.6.1 Grant activities and outcomes

The total of the grant to VGA was $300,000, to be funded over the period 2013 to 2015. This included $150,000 of industry contribution. The grant related to a project to maintain and augment communication and extension activities for vegetable growers in Victoria. The VGA project objectives included increased adoption of technologies and networking, enabling vegetable growers' better access to information, improved practices on-farm and increased participation by growers in industry activities and leadership.

The VGA project involved three areas of activities, as set out in Table 4.9. The table sets out the key desired impacts of each activity, and the key outputs in relation to each activity. The impact of the project activities is discussed below.

**TABLE 4.9** VGA PROJECT ACTIVITY OUTPUTS

| Project | Output | Key desired outcome |
|---|---|---|
| Print publications | 11 quarterly magazines<br>77 'In-the-field' newsletters | Dissemination of industry updates, research and development activities |
| Online communication activities | Website updates<br>Social media presence | Dissemination of industry updates, research and development activities |
| Industry engagement | Field days<br>Farm walks<br>Grower visits<br>Meetings | Information sharing on research and industry issues<br>Consultations on projects and proposals |
| Capability building | Leadership programs<br>Training<br>Farms walks and demonstrations | Training and education on skills and industry issues<br>15 participants in Industry Leadership program<br>Support for Nuffield scholarship |

*SOURCE: ACIL ALLEN CONSULTING*

The project activities undertaken by VGA primarily addressed an identified gap in information sharing between growers, researchers and other stakeholders. The print publications reached over 400 individuals over the duration of the project. This is likely to represent a significant portion of the 550 leafy and root crop growers in Victoria. VGA also operated as the interface between researchers and growers in the production and distribution of research. Over the course of the project, subscriptions were maintained and magazine distribution increased.

A secondary area of activity, capability building, involved the participation of more than 400 growers in workshops and industry activities. Activity within leadership development was identified as having a positive impact on participants' confidence, business skills and networks. In addition, participants reported positive perspectives on mentoring, industry promotion and participation in committees.

In implementing activities, the VGA encountered a number of challenges, such as low industry participation in network events and industry engagement activities. While the print or electronic information sharing and the more formal capability building activities (such as the industry leaders and Nuffield scholarship) showed positive impacts, it was difficult to schedule activities and events at convenient times for growers. Furthermore, the distances involved when working in regional contexts,

and a reduced demand for face-to-face delivery of information is reported to have hampered implementation. Lower than expected participation reduced the effectiveness of information sharing, and subsequent uptake of practices.

## 4.7 Major grants summary

The total value of the major grants through the HIN in the period 2011 to 2016 is $2.4 million. This includes industry contributions of $1.4 million and Departmental funding of $1.0 million. The primary areas of activity addressed capability building, industry engagement and communication activities. While it is challenging to quantify the exact reach due to the different characteristics of each industry, the activities undertaken collectively reached over 780 growers, producers and industry stakeholders.

**KEY FINDING 6**

The HIN major grants had varied impacts, dependant on their focus. A number of grants appeared to improve grower profitability by generating a number of changes including:

- increased productivity and efficiency through improved systems
- improvement in knowledge and skills related to contemporary industry issues
- implementation of new practices across management, use of technology and horticultural techniques.

The two HIN grants able to be analysed quantitatively are estimated to have a cumulative economic impact of around $3,470,000 (undiscounted) between 2013-14 and 2019-20.

# 5 REFORMING HIN: OPPORTUNITIES AND CHALLENGES

## 5.1 The overall impact of the Horticulture Industry Network

This section brings together the quantitative economic impact analysis set out in Chapters 3 and 4 (which focused on HIN elements and activities that were responsible for 48 per cent of HIN expenditure) and the impacts of those parts of the HIN which were not able to be analysed quantitatively (see Table 5.1).

**TABLE 5.1** OVERVIEW OF HIN COMPONENTS INCLUDED AND NOT INCLUDED IN ECONOMIC ANALYSIS

| HIN component | Industry funding | Government funding | Total funding | Share of all HIN funding | Inclusion in economic analysis |
|---|---|---|---|---|---|
| Major grants: ATGA, AWRI | $860,994 | $540,000 | $1,400,994 | 38% | ✓ |
| Major grants: VGA, FGV, ABA | $567,493 | $450,000 | $1,017,493 | 28% | × |
| Biosecurity | - | $351,750 | $351,750 | 10% | ✓ |
| Other activities | - | $870,982 | $870,982 | 24% | × |
| Total | $1,428,487 | $2,212,732 | $3,641,219 | | - |
| | | | | | |
| *HIN activities subjected to quantitative economic impact analysis* | | | *$1,752,744* | *48%* | - |
| *HIN activities qualitatively assessed* | | | *$1,888,475* | *52%* | - |

*SOURCE: ACIL ALLEN*

### 5.1.1 Overall economic impact

Through the evaluation, it has been possible to estimate the economic impact of the HIN biosecurity activities (refer section 3.3), the HIN grant to ATGA (refer section 4.3) and the HIN grant to AWRI (refer section 4.4). It is possible to sum the economic impact of these three components, and then compare these benefits to the cost of HIN (see Table 5.2).

The total estimated benefits over 2013-14 to 2019-20 in nominal terms are $4.46 million, compared with a program cost (to government and industry) of $3.64 million. The estimated undiscounted net benefits are $0.81 million.

It should be emphasised that this is an estimate of the lower bound for HIN's economic benefits as the analysis only includes 48 per cent of HIN activity (by expenditure), while including all of HIN costs. If the benefits of the other components of the HIN were able to be quantified it would be expected that HIN has a greater level of economic benefits.

**TABLE 5.2** SUMMING THE BENEFITS AND COSTS OF THE HIN (NOMINAL)

| | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 | 2019-20 | Total |
|---|---|---|---|---|---|---|---|---|
| Benefits | | | | | | | | |
| Biosecurity | - | $64,969 | $241,312 | $564,298 | - | - | - | $870,579 |
| ATGA grant | $2,775 | $141,927 | $959,115 | $489,149 | $299,359 | $152,673 | $51,909 | $2,096,907 |
| AWRI grant | $65,000 | $331,500 | $676,260 | $344,893 | $70,358 | - | - | $1,488,011 |
| Nominal total benefits | $67,775 | $538,396 | $1,876,687 | $1,398,339 | $369,717 | $152,673 | $51,909 | **$4,455,496** |
| Costs | | | | | | | | |
| Government funding | $750,232 | $592,500 | $490,000 | $380,000 | - | - | - | $2,212,732 |
| Industry funding | $724,580 | $469,957 | $233,950 | - | - | - | - | $1,428,487 |
| Cost of the HIN | $1,474,812 | $1,062,457 | $723,950 | $380,000 | - | - | - | **$3,641,219** |
| Undiscounted net benefits | | | | | | | | |
| Undiscounted net benefits | -$1,407,037 | -$524,061 | $1,152,737 | $1,018,339 | $369,717 | $152,673 | $51,909 | **$814,277** |

*SOURCE: ACIL ALLEN*

It is important to discount future economic returns, in recognition of the fact that there is a time component to the value of money.[10] While Victorian Department of Treasury and Finance (2013) recognises that 'there is no consensus on the appropriate discount rate for use in public sector project evaluations', it recommends a rate of 7 per cent for projects involved in the 'provision of goods and services in traditional core service delivery areas of government' which are linked to clear economic outcomes. As a result, Table 5.3 shows benefits and costs discounted using 7 per cent as a central case, 4 per cent as a high case (in the sense that economic impact is higher with a lower discount rate) and 10 per cent as a low case.

This analysis shows that under the central case (7 per cent discount rate), the benefit cost ratio of HIN is 1.11, rising to 1.15 in the high case (4 per cent) and falling to 1.06 in the low case (10 per cent).

[10] As set out in the Victorian Department of Treasury and Finance's (2013) Economic Evaluation for Business Cases Technical guidelines: 'Discounting is based on the concept of time preference. Time preference is reflected in positive market interest rates, which show that a future dollar is worth less than a current dollar. This occurs for several reasons: impatience, the expectation that wealth will grow over time, opportunities for productive investment, and uncertainty. Discounting acknowledges the opportunity costs of investing in a particular project by asking what return it would have produced in an alternative use.'

**TABLE 5.3** DISCOUNTED BENEFITS AND COSTS (IN 2016-17 DOLLARS)

| | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 | 2019-20 | Total (PV) |
|---|---|---|---|---|---|---|---|---|
| Discount rate 4 per cent | | | | | | | | |
| Total benefits | $76,238 | $582,329 | $1,951,755 | $1,398,339 | $355,497 | $141,155 | $46,147 | **$4,551,459** |
| Cost of the HIN | $1,658,963 | $1,149,153 | $752,908 | $380,000 | $0 | $0 | $0 | **$3,941,024** |
| Net benefits | -$1,582,725 | -$566,825 | $1,198,847 | $1,018,339 | $355,497 | $141,155 | $46,147 | **$610,435** |
| | | | | | | | Benefit-cost ratio | **1.15** |
| Discount rate 7 per cent | | | | | | | | |
| Total benefits | $83,027 | $616,409 | $2,008,055 | $1,398,339 | $345,530 | $133,351 | $42,373 | **$4,627,085** |
| Cost of the HIN | $1,806,708 | $1,216,407 | $774,627 | $380,000 | $0 | $0 | $0 | **$4,177,742** |
| Net benefits | -$1,723,681 | -$599,998 | $1,233,429 | $1,018,339 | $345,530 | $133,351 | $42,373 | **$449,343** |
| | | | | | | | Benefit-cost ratio | **1.11** |
| Discount rate 10 per cent | | | | | | | | |
| Total benefits | $90,209 | $651,459 | $2,064,356 | $1,398,339 | $336,107 | $126,176 | $39,000 | **$4,705,645** |
| Cost of the HIN | $1,962,975 | $1,285,573 | $796,345 | $380,000 | $0 | $0 | $0 | **$4,424,893** |
| Net benefits | -$1,872,766 | -$634,114 | $1,268,011 | $1,018,339 | $336,107 | $126,176 | $39,000 | **$280,752** |
| | | | | | | | Benefit-cost ratio | **1.06** |

*SOURCE: ACIL ALLEN*

**KEY FINDING 7**

The cumulative estimated benefits of the HIN between 2013-14 and 2019-20 are approximately $4.6 million, compared with a program cost (to government and industry) of $4.2 million (both in present value terms). The estimated benefit-cost ratio for the HIN is 1.11. This is an estimate of the lower bound for HIN's economic benefits as the analysis only includes 48 per cent of HIN activity (by expenditure), while including all of HIN costs. If the benefits of the other components of the HIN were able to be quantified it would be expected that HIN has a greater level of economic benefits, and a higher benefit-cost ratio.

### 5.1.2 Broader economic impacts

While it was not possible to quantify the economic impact of the network activities of the HIN (apart from the biosecurity work) through the evaluation, this does not suggest that the network has no economic benefits.

#### Economics literature on the economic value of networks

There is a considerable literature on the economic value of networks, including in agriculture. Much of this literature comments on the methodical challenge of quantifying the economic impact of networks, although some progress has been made.

Economists have long recognised that individual decision-making processes and economic outcomes are correlated with the behaviour of other agents. Examples of the effects of social networks on economic activity are abundant and pervasive, including roles in transmitting information about jobs, new products, technologies, and political opinions (Jackson 2010).

In the agriculture sector, networks are particularly important for innovation adoption (see for example, Munshi (2004), Bandiera and Rasul (2006) and Conley and Udry (2008)), as is recognised with the HIN's focus on accelerating the uptake of the latest technologies and information. Matuschke (2008) notes that farmers learn about the characteristics and risks of an innovation from three main sources: their own experience, the experience of others, and their interactions with formal sources, such as

extension agents or seed dealers. Both of the latter are influenced by farmers' formal and informal networks.

While there is limited developed country literature on the impact of networks in agriculture, there has been analysis of the economic returns to extension activities, which the HIN aims to build the capacity of industry associations to carry out. In their review of the literature focusing on the USA, Alston et al. (2010) found an overall median rate of return to extension of 63 per cent (higher than the median return they found for research of 48 per cent; which may be due to the more immediate effect of extension on productivity (Huffman and Evenson 2006)). In Australia, similarly relatively high rates of return have been identified for some extension activities (see Yu Sheng et al (2011) for a review of the literature).

**The broader economic value of the Horticulture Innovation Network**

As the economics literature indicates, there are significant economic benefits to networks in agriculture. This accords with the feedback from HIN members and Department staff consulted as part of this evaluation. Members and staff found that the HIN has provided unique and valuable opportunities for networking across industries (which tend to be siloed), and for discussing common issues and challenges. The network was seen as flexible and adaptive, and members benefited from personal development, organisational development, and technical learnings.

The literature and the findings discussed in Chapters 2 and 3 indicate that the HIN has played a role in reducing search costs for industry association members and, through the associations, for growers.

Search costs can be external or internal (Smith 1999). External search costs are those associated with the outward costs of searching for the required information. For example, an agricultural organisation might like to learn how similar organisations are minimising the effect of extreme weather conditions on crop yields. In the absence of a network connecting this organisation to similar bodies they would face monetary costs associated with locating and acquiring this information and/or the opportunity cost of time spent looking for the information. By having a network of relevant industry experience and expertise available these costs otherwise faced by an association member are reduced. Internal costs are the costs borne internally by an organisation in processing the information once obtained. Using the previous example, once the member organisation has acquired information on extreme weather conditions on crop yields it must then undergo additional costs in processing and integrating such information. The HIN plays a role here also by building the capability of members to use the information they have.

By reducing search costs, the HIN facilitates the diffusion of ideas and technologies to HIN members from other HIN members and from government scientists. The informal networks created through the HIN offer a source of knowledge transfer and diffusion that would otherwise be unavailable. The quicker new ideas and technologies are adopted, the earlier the impact of these ideas and technologies on grower productivity will occur.

Search costs are one facet of transaction costs or switching costs—when search costs are lowered, as is achieved through the HIN, economic agents are more likely to change to a new approach or technology. The internet has reduced search costs generally (Pereira 2005) and the HIN has worked to take advantage of this through the HIN website (which allows growers to access information on recent technologies and improved techniques in one website).

Lower search costs are an economic benefit that accrues to not just HIN members, but also external agents (such as growers) who interact with more than one HIN member. For example, a HIN member may come across an opportunity of relevance to another HIN member. By connecting the two parties, the HIN lowers the search costs of the external party (by providing it ready, relevant information) and increases potential economic opportunities to other member organisations.

The Victorian Government's involvement in the HIN is likely to address a type of market failure—a coordination failure—evident among horticulture industry associations. A coordination failure occurs when a group of economic agents could achieve a better outcome for all involved but fail to because they do not coordinate their decision making. The reasons for the individual economic agents failing to co-ordinate may be due to each acting rationally in their own self-interests. This paradoxical situation where economic agents pursue their individual self-interests which leads to an inferior outcome is

known as the 'Prisoner's Dilemma' (Nowak and Sigmund 1993). Prisoner's Dilemma situations, where the 'rational' course of action leads to a non-ideal outcome, can be overcome by trust and co-operation in the relationship between the economic agents. In the case of the HIN, the Victorian Government is able to act as an outside agent which increases trust and co-operation between members, the absence of which would mean that a suboptimal level of coordination and information sharing takes place.

In the case of the HIN, any single industry association does not have sufficient incentive to take on the mantle of leadership (a cost) for the network, as benefits (positive externalities) accrue to the other 'free-riding' members. Further, members lack the resources to initiate and run the network. As a result, without the intervention of the government, the network would not exist, although it likely delivers an overall benefit to the industries involved.

A potential further benefit to HIN member organisations comes from the stronger social structures produced from the network which have the effect of influencing and co-ordinating economic decision making at a collective level. Research into certain dress firms in the New York apparel industry (Uzzi 1996) suggests that stronger social relationships between firms may result in collective benefits in learning, risk-sharing, investment and speeding products to market. This is via the mechanism of preferencing long-term co-operative relationships over immediate short-term, self-interested gains. Though the HIN is a different industry facing vastly different pressures and types of issues, it is not impossible to suggest that the ongoing relationships facilitated through the HIN may result in similar kinds of benefits accruing to organisation members.

**KEY FINDING 8**

The HIN generates economic benefits which cannot be quantified given current data, but which are valuable. The economics' literature indicates that networks and extension activities in agriculture often yield high rates of return. The HIN has reduced search costs and likely facilitates the diffusion of ideas and technologies to HIN members from other members and from government scientists. The quicker new ideas and technologies are adopted, the earlier the impact of these ideas and technologies on grower productivity will occur.

## 5.2 Opportunities for reform of the Horticulture Innovation Network

While the HIN is operating effectively, and generating considerable benefits (as discussed in Chapters 2, 3 and 4 and section 5.1), there are opportunities to continue to improve the operation of the HIN and to better measure its impact.

The HIN is a longstanding program. Over the almost 10 years of operation, it has changed and improved as the needs of the Department and members have changed and as participants, particularly Department managers, have established what works well and what requires development.

The recommendations in this section have been developed in cognisance of this, and generally support the current direction in which the HIN is heading. Rather than suggesting wholesale change, the recommendations point to additional areas of incremental change consistent with many of the improvements made to HIN in recent years.

The recommendations are structured as follows:

- objectives and governance
- scope and work activities
- membership
- funding arrangements
- digital strategy
- impact measurement.

### 5.2.1 Objectives and governance

Over the three HIN iterations since 2008 (refer section 2.1.2), there has been a strong consistency in the objectives the HIN has sought to achieve. Putting aside the grant projects from the first and second phases of the HIN, each iteration has sought to:

- Generate grower practice change by introducing HIN members to new agricultural and business technologies and approaches (with the expectation that HIN members pass this information on to their grower members).
- Improve the capacity of HIN members to operate their industry organisations.
- Better inform industry organisations of government policy and strategy.
- Allow government to collect industry intelligence on the horticulture industry.

The achievement of these objectives has been sought through sessions with Department scientists and policy officers, networking among HIN members, formal training sessions, and intelligence sharing sessions.

Each of the objectives should continue to be the focus of the HIN, using the current methods, as described above, but with continued focusing on the unique capacity of the HIN to deliver horticulture-specific knowledge development, as discussed in section 5.2.2 below.

The Department should continue to lead the HIN, in part because the Department continues to derive considerable benefit from the HIN, and in part because in the absence of the Department driving the HIN is it unlikely that any of the HIN members would have the ability or capacity to take on the leadership role. This is due to the small size of industry associations in the horticulture sector and the existence of a coordination failure (refer section 5.1.2).

The Department is well placed to drive the HIN due to its contacts with relevant scientists (many within the Department) and its ability to be an impartial coordinator. The HIN also allows the Department to pursue its policy priorities, for example around biosecurity in the sector.

While the Department will need to continue to manage the HIN, opportunities to further include the HIN members in the running of the network should be explored. In the past, the Department has sought input from members on agenda items and been responsive to this feedback. This was particularly evident in planning for the 2016-17 year of the HIN, where a survey of members was used to drive the meeting topics for the current financial year.

Continuing this trend, the Department could encourage one or more industry association to take responsibility for each meeting, including driving the agenda and chairing the meeting. The Department would still need to provide support for the industry associations as they take on this role, but such a move would increase member ownership of the HIN and continue to build the capacity of HIN members.

Building on the approach undertaken to plan for the 2016-17 HIN, future iterations of the HIN could include an annual operational plan developed in partnership between the Department and HIN members. Through the plan, or using a separate charter, a set of HIN membership obligations could be developed to increase buy-in and set expectations. The obligations could include taking on organising responsibilities (refer 5.2.2) and recording impact measures (refer 5.2.6).

Changes such as these would drive a greater ownership of the network by HIN members and increase accountability. In turn, this should support the achievement of the HIN's objectives, and potentially reduce the resource burden of the HIN on the Department.

**RECOMMENDATION 1**

That responsibility for the operation of the HIN continue to reside with the Department, but that some responsibilities are devolved to industry association members to encourage greater buy-in from members. A charter of HIN membership obligations and an annual operational plan could be developed to support this process.

### 5.2.2 Scope and work activities

The scope and work activities of the HIN have been refined over the years, and the network currently meets six times a year with a focus in 2016-17 on biosecurity (refer to section 3.2), while continuing to incorporate other information sharing, training and networking on other content areas (refer to section 2.3).

One of the HIN's strengths, as recognised by stakeholders in consultations for this evaluation, is the ability of the network to be flexible and to maintain a topical agenda, with a focus on linking members with recent and relevant research.

The HIN should maintain this flexibility, while resisting drifting into areas of content or training where it does not have a comparative advantage. For example, the HIN has held training sessions on IT systems and applications in the past. While the impetus and demand for such training is clear (industry associations could realise productivity gains from improved use of IT), the HIN should be focusing on strategic horticulture issues, and allow members to build their IT capacity through other avenues.

The HIN should continue to look for opportunities to achieve practical change at the industry and grower level, including by focusing on recent commercial technologies and engaging researchers on applied industry problems. Applications for joint industry/researcher funding by HIN members is a good example of a collaboration aimed at practice change (successful applicants include APTRC and VICSPA), and opportunities like this should continue to be pursued in the future.

While the current work activities are reported to be meeting the needs of the industry association members, the HIN should look for more opportunities to improve its relationship with growers. There are clear links to growers through the HIN website and social media channels (refer section 2.3.5), which could be further developed, for example through broadcasting a selected hour of each HIN meeting to all interested parties though a webinar (refer section 5.2.5).

This could be part of a process to define how growers are informed of HIN-related learnings. The process could also include each member articulating their intended actions in regards to disseminating learnings to their industry at the end of each meeting, and then reporting back to the network at the beginning of the next meeting on how their actions were received by growers. This activity would allow members to learn from each other on grower engagement strategies and encourage members to think through the practical applications of the network (refer section 2.3.2).

**RECOMMENDATION 2**

That the HIN maintains its current focus on research dissemination and avoid drifting into areas of content or training where it does not have a comparative advantage. Actions to improve links with growers should be explored, and the HIN members should continue to look for opportunities to apply for funding for collaborative initiatives focused on practice change.

### 5.2.3 Membership

HIN has a broad set of members, including industry associations from most parts of the horticulture industry, including Victorian and national bodies (refer section 2.1.3).

While the potato and tomato sectors are represented on the HIN, the other vegetable sectors are no longer involved in the HIN. In late 2015, VGA, a HIN member, ceased operations and was succeeded by the national body AUSVEG, which has a Victoria arm AUSVEG VIC. AUSVEG has not joined the HIN.

Given the size of the sector's contribution to the Victorian horticulture industry (around 23 per cent in 2014-15), this is a significant gap in the current network. The Department is currently encouraging AUSVEG VIC to become a member of the HIN.

The turf industry (responsible for 1.7 per cent of the horticulture industry) is also not currently represented on the HIN, although the impact of this is somewhat ameliorated by the fact that the

nurseries (by the NGIV) and cut flowers (by VFF) sectors are represented. The representative from NGIV is also the Industry Development Officer for Turf Victoria, so opportunity exists to expand membership to Turf Victoria at relatively low cost. A similar arrangement exists in the nuts sector with PGA, AWIA, HGA and CAI represented by one individual.

The HIN will be best placed to recruit additional industry associations if the HIN members are able to articulate a strong case for involvement to potential recruits. This will be aided by the HIN having a strong operational plan (refer section 5.2.1) and a track record of achievement (refer section 5.2.6)

**RECOMMENDATION 3**

That the HIN continues to look to recruit key industry associations, including AUSVEG, to ensure the HIN has the broadest representation of horticulture industries.

Other potential opportunities for expansion include incorporating state-based organisations from jurisdictions other than Victoria. This was raised by a few stakeholders in consultations, and the HIN has explored this route in the past. However, it has proved particularly challenging. Considering these challenges and the importance of HIN ensuring comprehensive representation in Victoria, effort over the next couple of years is not best expended in this area.

This is not to say that interstate perspectives cannot continue to be incorporated into HIN activities—the HIN has a strong tradition of interstate visits and of attendance by interstate organisations and agriculture-related government departments. Such an approach should continue, particularly with NSW organisations, considering the importance of the region near the NSW border region for horticulture in Victoria.

While maintaining a Victorian membership, the HIN could consider opening up membership to organisations that are not industry associations, including agribusinesses. Such a move would present a number of opportunities, including opening the network up to new ways of thinking, and pushing industry organisations to focus more on the practical applications of HIN learnings.

A number of aspects of any such expansion would need to be managed, including membership criteria for non-industry associations, ensuring membership numbers are maintained at a manageable level, and continuing to have a strong agenda in place to drive the meetings.

If the HIN is able to transition successfully to an expanded membership, the network will be strengthened and members will be better placed to drive its activities.

**RECOMMENDATION 4**

That the opportunity to expand membership to different groups of stakeholders in the horticulture industry, including agribusiness, is explored.

### 5.2.4 Funding arrangements

As the major grants component has come to an end, the overall cost to government of the HIN has fallen from $750,000 (in 2013-14) to less than $380,000 per annum (in 2016-17). As industry contributions were recorded against each of the five major grants, the industry financial contribution to the HIN has fallen over the same period from $750,000 to zero (refer section 2.1).

The costs to government of operating the HIN in 2016-17 (with no grant projects) can be disaggregated as follows: $310,000 for Department salaries and other operating costs, $70,000 to reimburse HIN members for travel costs incurred in the attendance of HIN meetings, and approximately $40,000 for HIN website costs. Department salaries provide for 1.45 full time equivalent (FTE) staff.

While there would be benefits to industry contributing financially to the continued operation of the HIN, particularly around increasing industry ownership, there are considerable risks to this approach. Under a cost contribution or cost recovery approach, the industry associations that are the weakest financially would likely be the first to withdraw from the network. As the value of a network increases exponentially with the number of members, the withdrawal of some members will significantly reduce the value of the network to remaining members. At the same time, the costs of administering the network are largely fixed, and will result in an increased cost of membership for the remaining members. The combination of reduced benefits and increased membership costs will cause the network to shrink further, likely leading to a rapid dissolution of the HIN.

Instead, as discussed above in sections 5.2.1 and 5.2.3, other changes to the HIN should be made to reduce the management burden on the Department and encourage HIN members to take on more organisational responsibility. This should allow the Department staff FTE devoted to the HIN to fall over time.

**RECOMMENDATION 5**

That, to reduce the cost of the HIN to government, HIN members take on more organisational responsibility for the HIN, allowing the Department to devote fewer resources to the network.

### 5.2.5 Digital strategy

The HIN has had a digital strategy in place for a number of years that includes a website, video production and social media accounts (refer section 2.3.5). Consultations indicate mixed views of the website, with some stakeholders reporting it generating significant value, while others saw the website as peripheral to their work.

At the time of writing (February 2017), the website is being refreshed, in line with the 2016 recasting of HIN to include a renewed focus on biosecurity. The objective of the website refresh is to ensure collaboration with industry sectors in managing the web-based knowledge exchange hub.

The Department is also working with Charles Sturt University (as part of an Australian Research Council funded project[11]) to review the HIN website and electronic communication. This research will provide advice and recommendations on achievements, opportunities for improvement, and innovative ways to develop the service. The project is due to report in July 2017 and should inform changes to the HIN website.

While this evaluation has not focused particularly on the HIN digital strategy, unlike the Charles Sturt University research, some opportunities to be considered in the HIN website refresh have been identified.

There is a breadth of agriculture and horticulture websites in existence which provide similar information, which makes it essential that the HIN website is differentiated to provide a valuable service to industry. Feedback collected in the 2013 evaluation indicated a preference for short, easily accessible information. The HIN website interface could be improved to allow users to more quickly access both the industry and content they require. This could involve:

- more clearly differentiating content between users and their needs (for example, growers, businesses, industry professionals)
- improving the separation of different industry groups (for example, table grape growers, pears, almonds)
- tailoring the information and services provided (for example, targeting information gaps in the network rather than hosting the breadth of content).

[11] The project is called: 'Information seeking and research adoption: assessing communication strategies'

The website refresh provides a good opportunity to continue to work with HIN members to ensure the website meets HIN member and grower needs, and encourage HIN members to promote the website among the grower members.

**RECOMMENDATION 6**

That the HIN website be refreshed to improve useability and industry alignment, including by considering the forthcoming recommendations of the website research project.

### 5.2.6 Impact measurement

The HIN has a strong record of evaluation—four evaluations have been carried out over the last six years (refer section 1.1.3), and after most HIN meetings the Department surveys HIN members on their experience of the meeting. There is also clear evidence that these feedback mechanisms are yielding information that the Department is acting on to continuously improve the HIN.

A key part of this evaluation is the quantification of the HIN's outcomes and economic impacts. This is particularly important as government is increasingly looking for clear outcome measures when deciding which programs to fund.

While it was possible to estimate the economic impact of around half of the HIN activities (by expenditure, refer section 5.1), if the impact of the full breadth of HIN activities are to be measured in the future, the program will need to develop an impact measurement strategy to collect the required information as the HIN operates.

The strategy should define the key performance indicators (KPIs) for the HIN, the data required to report on these KPIs, how the data will be collected, how the data will be analysed and the analytical outputs required (for example, that a benefit-cost ratio is required).

The most challenging part of this strategy will be determining the process by which the data are collected. The most important outcomes for the HIN centre on practice change at the grower level, which leads to productivity increases. Measuring such change and linking it to the HIN is difficult.

An option is for HIN members to keep a log book to record their learnings from HIN, and report how they have used these learnings and/or disseminated these learnings to their grower members. While this may seem administratively burdensome, it should be possible for HIN members to complete the log book relatively quickly.

The log book approach would support members reporting at the beginning each meeting on their HIN-related actions since the last meeting (refer section 5.2.2) and could form part of the specified member obligations (refer section 5.2.1).

It would be important to develop the capacity of HIN members to track and record impacts through discussion of how such data would be used and case study examples.[12]

The key data collection areas are described below in Table 5.4. Data on sales, revenue and profits will need to be collected from growers to measure the economic impact of HIN. Commercial considerations could cause growers to be cautious about providing such information, and so the HIN will need to provide assurances around confidentiality. These data are key to establishing the economic impact of the HIN, and should be used to compare pre-HIN intervention and post-HIN intervention sales, revenue and profits to establish the marginal impact of the HIN intervention on one or more growers.

[12] In consultations HIN members reported that it is difficult to quantify the benefits of the HIN to participant industries and growers.

**TABLE 5.4** DATA COLLECTION AREAS AND REQUIREMENTS

| Data collection area | Data requirements |
|---|---|
| Overview of the HIN learning/activity | A description of the HIN learning or activity which brought about the impact |
| Link between the HIN learning/activity and the grower/s | A description of how the HIN learning or activity was transmitted to growers |
| Impact on grower/s' practice | A description of how growers have changed their practices due to the HIN |
| Economic impact measurement | The grower/s pre-HIN intervention and post-HIN intervention:<br>– revenues<br>– profits<br>– number of workers employed and wages<br>– domestic sales<br>– exports<br>– prices received for key sales varieties<br>– cost reductions realised |
| HIN contribution to impact | A description of other factors which could have contributed to the economic impacts, and an estimate of the share of the economic impacts caused by the HIN. |

*SOURCE: ACIL ALLEN*

**RECOMMENDATION 7**

That an impact measurement strategy be developed to define the key outcome indicators for the HIN, and to set out how additional data will be collected to measure the impact of the HIN against these indicators.

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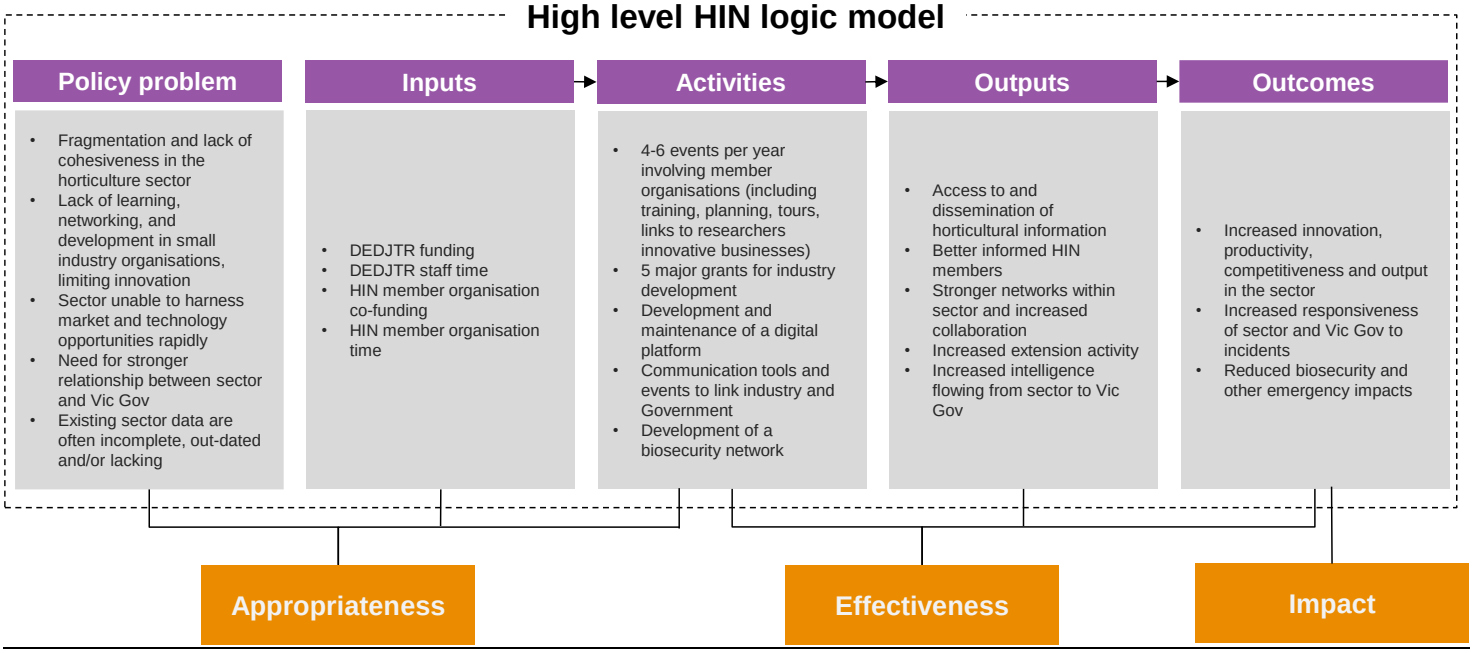
# A EVALUATION RESEARCH AREAS AND RESEARCH QUESTIONS

## A.1 Research areas

The evaluation research areas and research questions are linked to the HIN logic model (Figure A.1). The evaluation has three areas of research:

- Effectiveness—to examine how the HIN activities have translated into outputs and outcomes.
- Impact—to establish the economic impact of the HIN.
- Appropriateness—to examine the suitability of the HIN and possibilities around future design of the HIN.

**FIGURE A.1** LOGIC MODEL AND RESEARCH AREAS




*SOURCE: ACIL ALLEN*

## A.2 Research questions

Within the three research areas, there are a number of key research questions (Table A.1).

**TABLE A.1** KEY RESEARCH QUESTIONS

| |
|---|
| Appropriateness |
| 1. Is the HIN designed to meet the needs of the Victorian Government and industry? |
| 2. Are the HIN inputs (including Government funding and industry co-funding) and activities appropriate for addressing the identified policy problem? |
| Effectiveness |
| 3. Are the HIN activities and outputs producing the desired outcomes? |
| 4. How could the HIN programs be improved? |
| 5. How can the Department better monitor the economic performance of the HIN programs, and what are the associated data requirements and collection methods? |
| Impact |
| 6. What are the net economic, social and environmental impacts of the HIN? |
| 7. What are the likely net economic, social and environmental impacts of the HIIN? |
| 8. What is the sensitivity of these impacts to changes in key variables? |

*SOURCE: ACIL ALLEN*

# B CONSULTATION STAKEHOLDER LIST

The consultation stakeholder list is provided in Table B.1.

**TABLE B.1** CONSULTATION STAKEHOLDERS

| Name | Organisation, role | Grant type | Consultation session |
|---|---|---|---|
| HIN members | | | |
| Brett Rosenzweig<br>Ross Skinner | Almond Board of Australia (ABA), IDO<br>Almond Board of Australia (ABA), CEO | Major grant | Single interview |
| Julie Goodwill<br>Tony Filippi | Fruit Growers Victoria (FGV)<br>Formerly Fruit Growers Victoria (FGV), IDO | Major grant | Single interview |
| Jeff Scott<br>Rowena Norris | Australian Table Grape Association (ATGA), CEO, major grant report author<br>Australian Table Grape Association (ATGA), Manager Communications, major grant report author | Major grant | Single interview |
| Ken Orr | RMCG (consulting company), Vic Manager (was Vegetable Growers Association), major grant report author | Major grant | Single interview |
| Mark Krstic | Australian Wine Research Institute (AWRI), Vic Node Manager, major grant report author | Major grant | Single interview |
| Liz Mann | Australian Processing Tomato Research Council (APTRC), IDM | Minor grant | Minor grantee teleconference |
| Phil Chidgzey<br>John Hawtin | Dried Fruit Australia (DFA), CEO<br>Dried Fruit Australia (DFA), IDO | Minor grant | Minor grantee teleconference |
| David Reid | Nursery & Garden Industry Victoria (NGIV), IDO | Minor grant | Minor grantee teleconference |
| Trevor Ranford | Pistachios, Chestnuts, Hazelnuts, Walnuts, EO | No grant | Minor grantee teleconference |
| Jonathan Eccles | Raspberries and Blackberries Australia (RABA), EO | Minor grant | Minor grantee teleconference |
| Owen Brinson | Victorian Farmers Federation (VFF) Cut Flowers | Minor grant | Minor grantee teleconference |
| Nigel Crump | Victoria Seed Potato Association, ViCSPA, CEO | No grant | Minor grantee teleconference |
| DEDJTR staff | | | |
| Tony Fay | Senior Advisor, Ag & Rural | n/a | Single interview |
| HIN project team | Sue McConnell, Jenny Treeby, Mark Hincksman | n/a | Group teleconference |
| Wendy Coombes | Acting Project Manager Biosecurity, Improved Market Access for Horticulture | n/a | Single interview |

| Name | Organisation, role | Grant type | Consultation session |
|---|---|---|---|
| Liz Morse-McNabb | Senior Research Scientist, Remote Sensing | n/a | Single interview |
| Ian Goodwin<br>Dario Stefanelli | Research Manager, Plant Prod Sci<br>Research Scientist, Plant Physiology | n/a | Single interview |

*SOURCE: ACIL ALLEN*

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