



**Australian vegetable industry Strategic  
Investment Plan White Paper**

**VG10115 prepared by CIS**

**December 2011**



**AUSVEG**



*Horticulture Australia*



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## Key dates and submission process

The key dates and submission process in respect of this White Paper and draft vegetable industry Strategic Plan and Strategic Investment Plan (SIP) are highlighted below.

CIS consultations and review process	February 2011 to August 2011
National consultation on draft White Paper	September 2011 to October 2011
Vegetable industry IAC approval of White Paper	17 <sup>th</sup> November 2011
White Paper released	<b>22nd December 2011</b>
Due date for submissions	16 <sup>th</sup> February 2012
Reporting of feedback to IAC	23 <sup>rd</sup> February 2012
Final SIP released	May 2012
Design of projects	TBD
Tenders for R&D levy projects	TBD

Written submissions to this White Paper and draft vegetable industry Strategic Plan and SIP must be provided by 16<sup>th</sup> February 2012 to:

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# 1. Executive summary

## 1.1 *Review of the Australian vegetable industry*

AUSVEG, in partnership with HAL, seek to develop a Strategic Plan for the Australian leviable vegetable industry; which sets out a realisable 10 year vision for the vegetable industry. The Strategic Plan incorporates a Strategic Investment Plan (SIP) which will guide the investment of the vegetable R&D levy to achieve this vision. The industry is required to provide a SIP to the Department of Agriculture, Fisheries, and Forestry (DAFF) to represent the strategic direction of the industry and to guide the Vegetable Industry Advisory Committee (IAC) in making levy investment decisions. Upon endorsement of the Strategic Plan and accompanying SIP, it will be supported by a specifically developed extension capability and implementation road map.

In the development of the Strategic Plan and SIP, extensive and ongoing consultation has been undertaken with stakeholders involved in each aspect of the vegetable industry including levy payers, researchers, private companies and representatives from HAL, IAC, AUSVEG and Working and Advisory Groups - with 200 participants consulted. In addition, economic modelling undertaken by the Centre for International Economics (CIE) provided an impact assessment to guide the strategic outlook for the industry and the R&D investment. The SIP has also been tested with over 100 levy payers across the key growing regions, to test their support of the SIP.

## 1.2 *Industry overview*

The Strategic Plan must deal with a vegetable sector that is multifaceted, combining many businesses that are geographically dispersed, comprised of people from varying ethnic and cultural backgrounds, and supplying a variety of products to meet domestic and overseas consumer demand. It must deal with a vegetable sector that comprises approximately 6 thousand<sup>1</sup> growers, and spans 136 different types of crops. Needs are also varied due to growers size, different business models, integration into supply chain, mindset, strategic outlook and skill base. This fragmentation is exacerbated by the different growing conditions across the country.

The vegetable industry is now a multi-disciplinary business and part of often global supply chains. For example, the industry benefits from, and draws knowledge from, a variety of fields such as plant breeding and production, greenhouse technologies, irrigation, climate control, information technologies, product processing, packaging, logistics and consumer science,

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<sup>1</sup> It is difficult to determine the exact number of farmers producing vegetables, as there is discrepancy in varying data sources. AUSVEG website provides that there are approximately 5832 farms. ABARE statistics show that there are 3259 commercial farms, which are farms that have over \$40,000 valued farming output – see ABARES Australian vegetable growing farms: an economic survey 2008-09.



among others.

## 1.3 Development of a draft Strategic Plan

### 1.3.1 What is the vision for the industry?

VegVision 2020 established the vision for the industry in 2006 –“ to double the 2006 value of fresh, processed and packaged vegetables in real terms by stimulating and meeting consumer preferences for Australian products in domestic and global markets”. Based on current projections it is unlikely that this goal will be realised. While an ambitious goal is admirable, measurement by industry ‘value’ or revenue may not be the most appropriate metric as it does not account for other factors such as growth in input costs. This White Paper outlines a realisable vision for the industry, which is:

***“To be a cohesive, sustainable and highly efficient industry focused on growing demand profitably”.***

### 1.3.2 What are the strategic priorities for the industry to achieve the vision?

The four key strategic priorities for the industry have been identified to take into account the areas that are likely to have tangible and measureable impacts for the industry and to achieve this vision. These four areas also align to the key components of the value chain for the industry:

1. Consumer Alignment
2. Market & Value Chain Development Business Management
3. In-field productivity & resource use

### 1.3.3 The strategic investment plan (SIP) - how should the R&D levy be invested?

Analysis of the way in which the R&D levy has been spent over the past five years and current allocated spending, suggests that the levy spending has not been invested in a manner which achieves optimal outcomes for the industry, nor is it aligned with the recommended proportions of spending under the existing VegVision 2020 business case.

Spending has been characterised by small, short-term investments which are not aligned to the strategic priorities outlined in VegVision 2020, rather it has been focused primarily on in-field productivity & resource use. Some of the reasons that this spending pattern may have occurred include the structures and processes by which the R&D levy projects are developed and assessed as well as the lack of internal processes for monitoring the alignment of R&D levy spending to strategic priority

areas.

Impact modelling has provided guidance around the spending of the R&D levy in accordance with the strategic priorities, to maximise the impact for the industry. This modelling, combined with levy payer feedback, results in the following proposed spending allocation of the R&D levy:

- Consumer Alignment – 45%;
- Market & Value Chain Development– 20%;
- Business Management – 20%; and
- In-field Productivity & Resource use– 15%.

Compared to the past investment of levy funds, the new SIP is more heavily focused on understanding and meeting consumer demands while developing capabilities to expand into new markets. The industry's strategic focus is intended to over time shift away from production and farm input issues. What this strategic shift specifically means for growers is:

- More investment aimed at growing demand for Australian vegetable products;
- More investment aimed at growing the value of Australian vegetable products to consumers;
- More investment aimed at expanding the domestic and global markets for Australian vegetable products;
- More focus on achieving grower benefits by considering the needs of the entire supply chain;
- More projects driven by understanding and delivering the preferences and expectations of vegetable consumers;
- More investment in large R&D programs that are focused on common industry goals;
- More focus on projects that have a direct relationship to profitability (modelling suggest that a 42% increase in aggregate profits are expected over the next 10 years);
- Less investment in small, projects spanning numerous, unrelated topics of R&D;
- Less levy investment in on-farm productivity issues; unless solving these issues aligns with the needs of consumer demand driven programs; and
- Prima face, less research into pest and disease prevention and control unless

there is a threat to a significant portion of the industry.

#### **1.3.4 What are the key performance indicators for the industry?**

Having identified a target vision and strategic priorities for the industry, the SIP guides how the R&D levy should be spent to achieve this vision. Following from this, tangible and measurable key performance measures (KPIs) are needed to assess whether the industry is spending the R&D levy in a manner which is achieving the vision under the Strategic Plan.

The KPIs used to measure this, include an overarching goal of increasing aggregate grower profitability by 42% from \$126 million in 2011/12 to \$179 million in 2019/20.

#### **1.3.5 Are the development and extension arrangements appropriate?**

Analysis of the implementation of the outputs of the R&D levy reveals that development and extension has been a long held concern to all stakeholders in the vegetable industry.

In recognition of these concerns, efforts have been made to improve the development and extension processes by implementing a Vegetable Industry Development Program (VIDP). Due to the complexity of the structure of the program and various challenges faced by the participants, there are improvements that can be made to better the development and extension processes and simplify the arrangements.

Successful development and extension is also hindered by the lack of cohesion in the industry; such as the duplication, complexity and overlap which results from the federal system. Alignment between the states and national priorities over time would potentially enhance the ability for the vision and goals of the industry to be realised.

#### **1.3.6 Implementation of the Strategic Plan and SIP**

Once the strategic outlook and guiding documents are finalised, the industry should then confirm the extension and implementation arrangements to ensure the outcomes of the SIP are realised. Those drafted as part of the SIP process should be used as the basis of the implementation and extension arrangements.

## 2. The purpose and framework for the review

### 2.1 What is the purpose of the review?

In 2006 the Australian vegetable industry undertook a strategic planning process which culminated in the development of the VegVision 2020 Strategic Plan. The aim of the plan is *“to double the 2006 value of fresh, processed and packaged vegetables in real terms by stimulating and meeting consumer preferences for Australian products in domestic and global markets”*.

AUSVEG, in partnership with HAL, now seek to redevelop a Strategic Plan which incorporates a Strategic Investment Plan (SIP) for the industry. The industry is required to provide a SIP to the Department of Agriculture, Fisheries, and Forestry (DAFF) to represent the strategic direction of the industry in order to guide the Vegetable Industry Advisory Committee (IAC) in making levy investment decisions. The Strategic Plan sets out a realisable 10 year vision for the vegetable industry and it will incorporate an SIP which will guide the investment priorities for the vegetable R&D levy to achieve this vision. Progress of the industry, the success of R&D levy projects and their alignment to the SIP will be monitored through an objective set of performance measures.

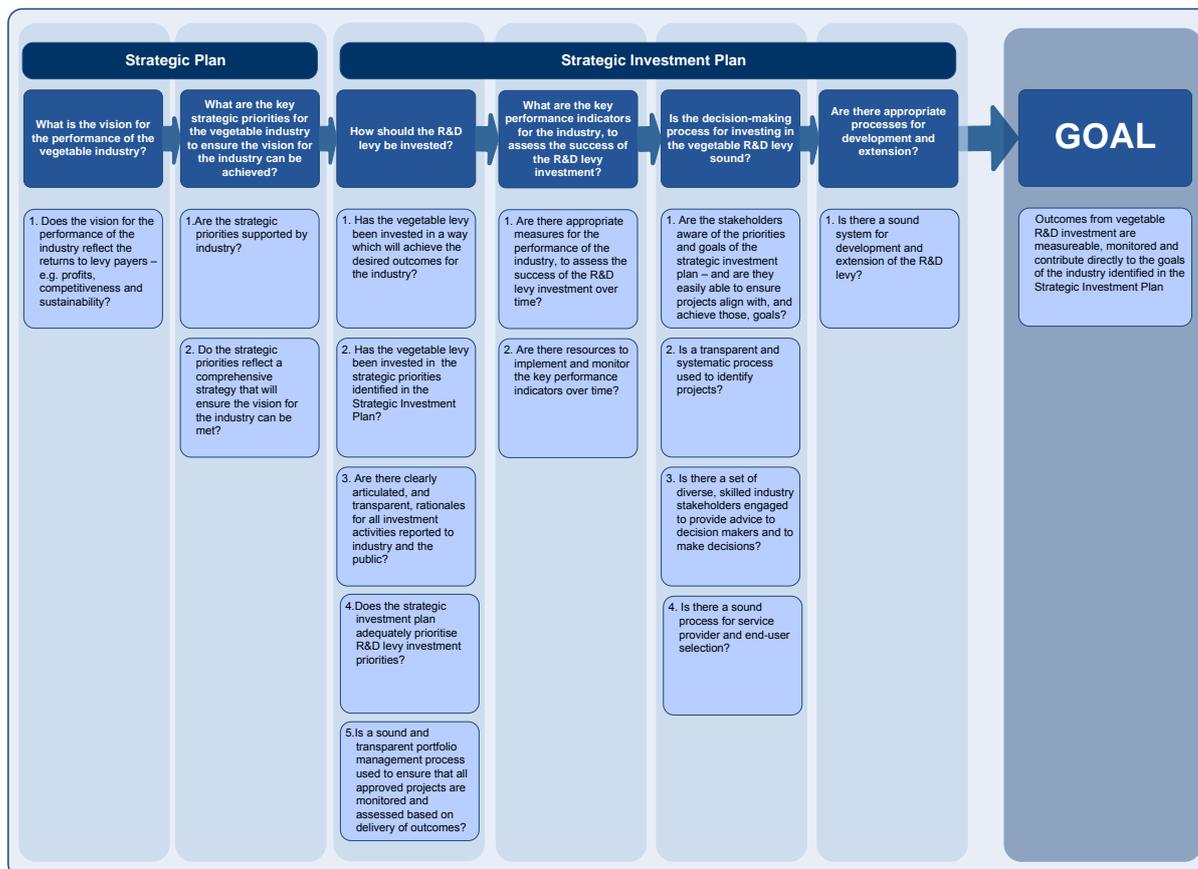
Ultimately, the Strategic Plan and SIP should be supported by improved governance arrangements and a detailed implementation road map that spells out the activities, timing and responsibility of people to progress the implementation.

The development of the Strategic Plan and SIP is conducted in light of the overarching challenges and opportunities for the industry and the historical performance of the industry with respect to the industry’s performance and investment spending of the R&D levy since 2006. In determining priority areas for the R&D levy the economic impacts of investment options has been modelled using the horticulture specific *Hi\_link* model.

## 2.2 The Framework for this White Paper

The overall framework developed for this White Paper and to guide the development of the strategic priorities for the vegetable industry is outlined in Figure 1.

Figure 1 - Outline of the process to develop the Strategic Plan and SIP



## 2.3 Investigation process

CIS undertook an extensive research and consultation process over the period from February to November 2011. Consultations were conducted with participants throughout the vegetable industry including levy payers, researchers, private companies (including retailers) and representatives from HAL, IAC, AUSVEG and Working and Advisory Groups. In many cases this consultation with these participants was ongoing. The key consultations were as follows:

**Figure 2 - Summary of CIS Work**

Stakeholder Groups	Count
Number of Working Advisory Group Participants	51
Number of Growers Involved	72
Peak Body Members Interviewed	20
Other Industry Body Members Interviewed	14
Buyers & Sellers Interviewed	10
R&D Levy Service Providers and Analysts	26
Government Members Interviewed	3
Other	4
National Consultation Phase:	
Levy Payers	104
Non-Levy Payers	26
<b>Total Number of Stakeholders Contacted</b>	<b>330</b>

200 participants were interviewed or included in focus group discussions, including hypothesis testing with relevant stakeholders. Participants are listed in Appendix I. In addition a comprehensive literature review and review of vegetable sector levy funded projects was undertaken. Modelling of the economic impacts by CIE provides an impact assessment to guide the strategic outlook for the industry and the R&D investment.

A national consultation phase was used to communicate to over 100 levy payers the findings and key implications of the SIP.

It should be noted that a large portion of data used for industry analysis and impact

assessment was derived from ABS and ABARE statistical publications; which are sources often criticised for their methods of collection, inclusion of non-leviable vegetables, and inconsistencies with other data sources. However, these are the most reliable and complete sources of quantitative industry data available for such analytical assessment.

## 3. Vegetable industry outlook

### 3.1 *Overview of the vegetable industry*

This Strategic Plan must deal with a vegetable sector that comprises an estimated 6 thousand<sup>2</sup> growers and spans 136 different types of vegetable crops. Needs are varied across regions, crops, position within the supply chain, and scale of operation.

In summary, the vegetable industry in Australia<sup>3</sup>:

- Is a diverse industry with multiple and widespread regional locations around Australia in temperate and tropical climates.
- Comprises a diverse and highly commercial supply chain of growers, packers, processors, marketers, wholesalers, agents, providers, retailers, and food service companies. These sectors encompass a diverse array of enterprise structures including: multi-national agri-food corporations (including food processors, food service, quick service restaurants); major retail chains; small to medium incorporated enterprises (SMEs) in each sector; and sole trader/partnerships, especially in the growing sector.
- Produces fresh produce (the major product in volume and value); fresh packed value-added products (representing a growing market segment for consumers seeking convenience); processed vegetables in significant volume and traded on a commodity basis including frozen (fries, peas, beans, mixed vegetables), canned and dried vegetables; ingredients for other food products; and dietary supplements.
- Comprises a range of industry organisational arrangements that service the vegetable growing sector of the industry.
- Is made up of people from a variety of ethnic and cultural backgrounds.

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<sup>2</sup> It is difficult to determine the exact number of farmers producing vegetables, as there is discrepancy in varying data sources. AUSVEG website provides that there are approximately 5832 farms. ABARE statistics show that there are 3259 commercial farms, which are farms that have over \$40,000 valued farming output – see ABARES Australian vegetable growing farms: an economic survey 2008-09

<sup>3</sup> Kiriganai Research Pty Ltd; 2005, 'The Australian Vegetable Industry: Taking Stock and Setting Directions'; Canberra.



### 3.2 Performance of the vegetable industry

Profit margins have contracted in recent times as a result of strong increases in farm input prices (e.g. energy, labour costs due to shortages of skilled labour), negative impacts of extreme weather conditions on production and the high cost recovery after natural disasters such as the 2011 floods in Victoria and Queensland. A significant rise in prices is the likely offset to the food shortages due to floods, with the threat of imports increasing due to those weather conditions and the appreciating Australian dollar.

Recent ABARE statistics show that when vegetable growers are disaggregated by size there is a close correlation between size and profitability. The top 25% of growers are more profitable, with average cash incomes (revenue minus costs) in excess of \$6 million.<sup>4</sup> Of the bottom 25% of growers, one third of them are failing to cover the costs of production. Explanations have been sought for this difference in performance. The more profitable vegetable growers:

- operate on larger farms and are more specialized in vegetable production;
- achieve economies of scale in production;
- have higher levels of debt and therefore less equity in their farms (higher revenues however enables lower debt servicing ratios); and
- are more likely to export and sell to markets interstate as well as directly to vegetable processors.<sup>5</sup>

Figure 3 summarises the financial performance of vegetable farmers by profitability.

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<sup>4</sup> Ian James, 'The other side of the coin', Vegetables Australia, January/February 2011, p.40

<sup>5</sup> Ian James, 'The other side of the coin', Vegetables Australia, January/February 2011, p.41

**Figure 3 Financial performances of vegetable farms by rate of return**

<b>Financial Measure</b>	<b>All Industry</b>	<b>Bottom 25%</b>	<b>Middle 50%</b>	<b>Top 25%</b>
Total Cash Receipts	\$682,683	\$130,865	\$450,056	\$1,865,323
Total Cash Costs	\$478,499	\$147,922	\$349,180	\$1,058,996
Farm Cash Income	\$204,235	(\$17,057)	\$100,875	\$626,328
Proportion with Negative Cash Income	10%	34%	3%	0%
Farm Business Profit	\$110,649	(\$93,517)	\$15,177	\$500,298
Proportion with Negative Business Profit	55%	100%	60%	0%
Rate of Return Excl. Capital Appreciation	5%	(7%)	2%	14%
Equity Ratio	85%	87%	87%	81%
Farm Business Debt (\$'000)	\$431	\$156	\$392	\$785

*Source: ABARES – Australian vegetable growing farms: an economic survey 2008-09*

## 4. Vegetable industry challenges

The vegetable industry is now a multi-disciplinary business and often part of global supply chains. For example, the industry benefits and draws knowledge from a variety of fields such as plant breeding and production, greenhouse technologies, irrigation, climate control, information technologies, product processing, packaging, logistics and consumer science, among others.

The industry is supply driven, with growers having little influence on demand (excluding export opportunities) or prices. However, in commoditised products, there are mechanisms to increase value and margins through the supply chain and increase access to new markets. In general, many growers do not focus on or realise opportunities and challenges associated with this multi-disciplinary business, focusing predominantly on production issues, as opposed to issues such as supply chain and markets. This is also reflected in the focus of levy funds; where over 50% are invested in on-farm production type issues.

To maintain its competitiveness, the industry must deal with the key strategic challenges.

Some of the major challenges for growers to succeed in this environment include:<sup>6</sup>

- close knowledge of consumers' values and buying preferences and the ability to supply products which meet consumer expectations;
- major investment in differentiation against the best competing suppliers from anywhere in the World;
- continuity of supply over the whole year, requiring sufficient volumes and the ability to source the product at any time during the year;
- capacity to supply domestic and export markets as the distinction blurs between those markets;
- business approach and systems to deal with more consolidated buyers including retail and food service chains (including professional management and labour skills);
- capacity and systems to supply global sourcing networks – new business models to achieve scale;
- building long-term relationships with buyers and being able to supply to their specifications;
- accessing capital for growth and investment; and

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<sup>6</sup> See VegVision 2020 for this summary

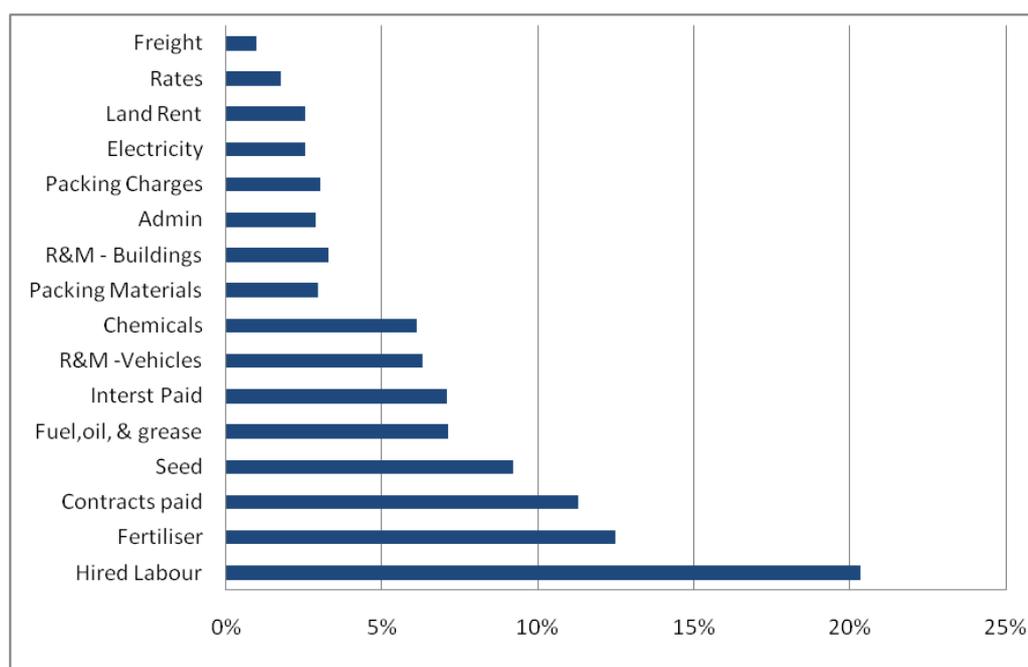
- maintaining sustainability in the face of climate change, adverse weather conditions and other environmental and regulatory restrictions (e.g. increasing controls over chemicals usage). Industry fragmentation.

To maintain its competitiveness, the industry must deal with these, and other, key strategic challenges. The following challenges were of particular concern to levy payers and stakeholders during the SIP consultation process.

#### 4.1 Input costs

A recent ABARE survey of vegetable farms revealed that input costs had increased significantly over recent years and have had a significant impact on grower profitability.<sup>7</sup> As illustrated in Figure 4, large costs for growers are labour, contracts, seeds, machines, fuel, and fertiliser.

**Figure 4 - Cash Input Costs Shares per Farm (2009)**



Source: Sarah Crooks, 'Australian vegetable growing farms: an economic survey, 2008-09, ABARE-BRS research report 10.12, November 2010, p. 13

Labour costs are the highest cost for farms. From 2006 through 2009, labour costs increased on average 60% and accounted for 20% of total cash costs. When including imputed labour, labour costs account for approximately 50% of on-farm cash costs.<sup>8</sup>

<sup>7</sup> Ian James, 'The other side of the coin', Vegetables Australia, January/February 2011, p.41

<sup>8</sup> Calculated from information contained in ABARES Australian vegetable growing farms: an economic survey 2008-09, p.14



Profitable growers rated access to water, increased marketing costs, threat of imports and continuing low prices as high threats to their business. However, for less profitable growers urban expansion is also a significant issue.<sup>9</sup>

A longer term approach to mechanisation and technology may assist in reducing high labour costs. However, there are barriers to up-take and innovation in agricultural machinery:

- the use of imported equipment in Australian agriculture is estimated to be as high as 85% of the total equipment used;
- the use of enabling technologies for mechanisation such as e.g. computers and internet technologies, remains low in agriculture; and
- financial ability of farms to access innovative mechanical systems is low with nearly 60% of vegetable farms revenue at \$150 thousand p.a. or less. With the mechanical harvesters costing typically between \$100 thousand and \$450 thousand<sup>10</sup> farmers are unable to either justify or finance mechanisation even when available.

## 4.2 Carbon tax

The impact of the carbon emissions trading scheme is still unresolved at the time of writing, and therefore has not been specifically included in the *Hi\_Link* horticulture impact model. However the modelling does consider changing farm practices to reduce environmental impacts and has modelled these in terms of productivity losses.

Unlike other agricultural sectors that produce significant amounts of carbon from methane gas, the vegetable sector is not a major producer of carbon emissions. Legislation is also likely to exclude agricultural carbon emissions.

Despite vegetable growers not expecting to be directly impacted by any emission trading schemes it does pose a significant indirect impact as it could raise costs and therefore place further pressure on margins. Electricity for example typically represents 3% of growers' input costs (see Figure 4), and is vital to on-farm activities such as pumps for irrigation and refrigeration. In addition, rises in fuel costs will have an effect as heavy vehicle transport is required to get produce to markets and distribution centres in a quick and efficient manner.

It may also be a result that further processing will take place offshore, to capitalise on the cheaper costs of production overseas.

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<sup>9</sup> Ian James, 'The other side of the coin', *Vegetables Australia*, January/February 2011, p.41, ABARES –Australian vegetable growing farms: an economic survey 2008-09

<sup>10</sup> Dr Silvia Estrada-Flores, *Opportunities and challenges faced with emerging technologies in the Australian vegetable industry (Technology Platform 5: Production and Harvest)*, Project VG08087, completed 30 June 2010



### 4.3 Value chain

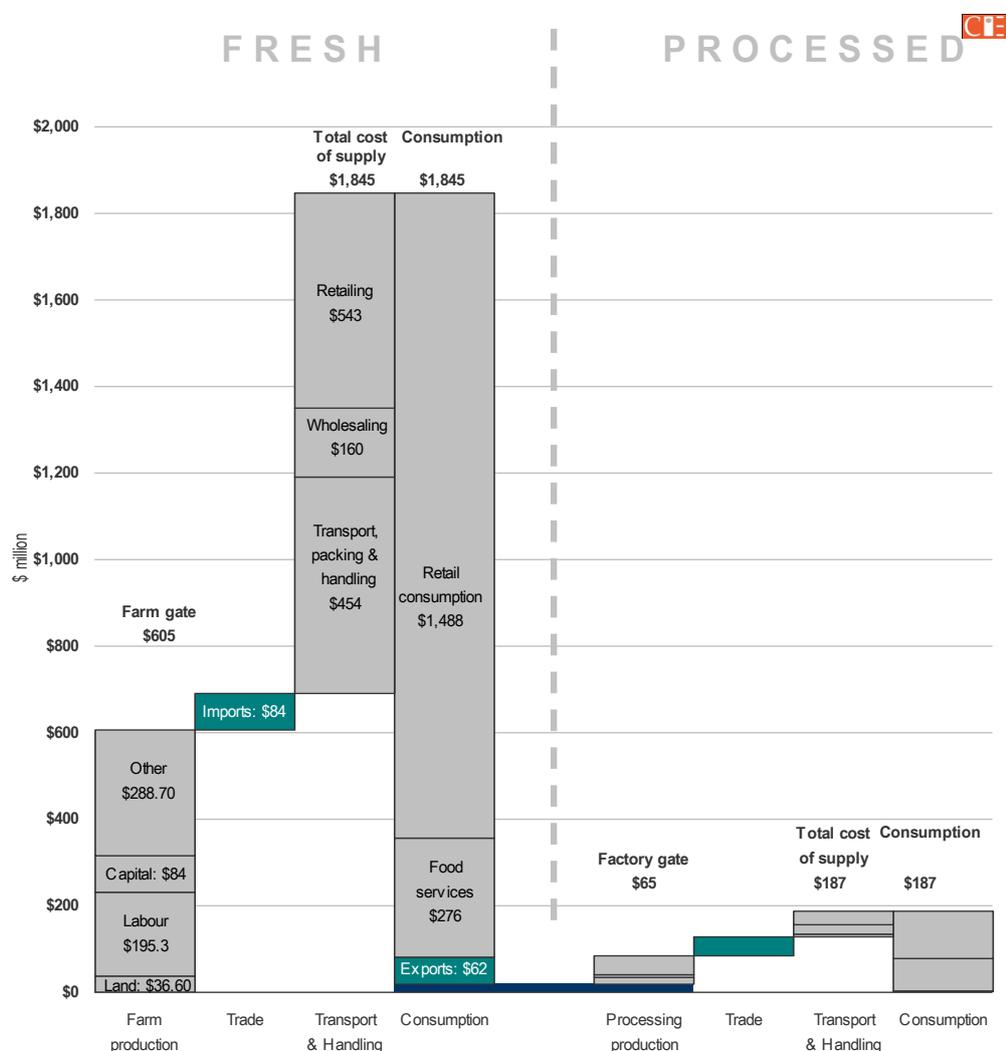
The value chain for the vegetable industry is of particular significance. Post farm gate costs of the horticulture sector generally account for half<sup>11</sup> of the total value of the industry. In the vegetable sector, however, the post farm gate costs account for only two-thirds of the total industry value.

Figure 5 summarises the key features of the aggregate value chain for the Australian leviable vegetable industries. It demonstrates how the retail value of levied vegetables (\$1.845 billion) is allocated across the various supply chain activities and allocated across the various consumption channels. For example, \$600 million of industry value is allocated to on-farm costs and profits, with an additional \$84 million of imported vegetables being sold into the Australian markets, and \$454 million of added-value provided by transport, packing, and handling services adding to the total sales price. These three cost categories produce the roughly \$1.2 billion annual value of product that is subject to the national vegetable levy; producing approximately \$6 million per year in levy funds; which is matched by the Commonwealth.

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<sup>11</sup> Future Focus Table 2.1 Aggregate value chain for horticulture 2005-2006

Figure 5 - Aggregate value chain for levied vegetables 2011–11



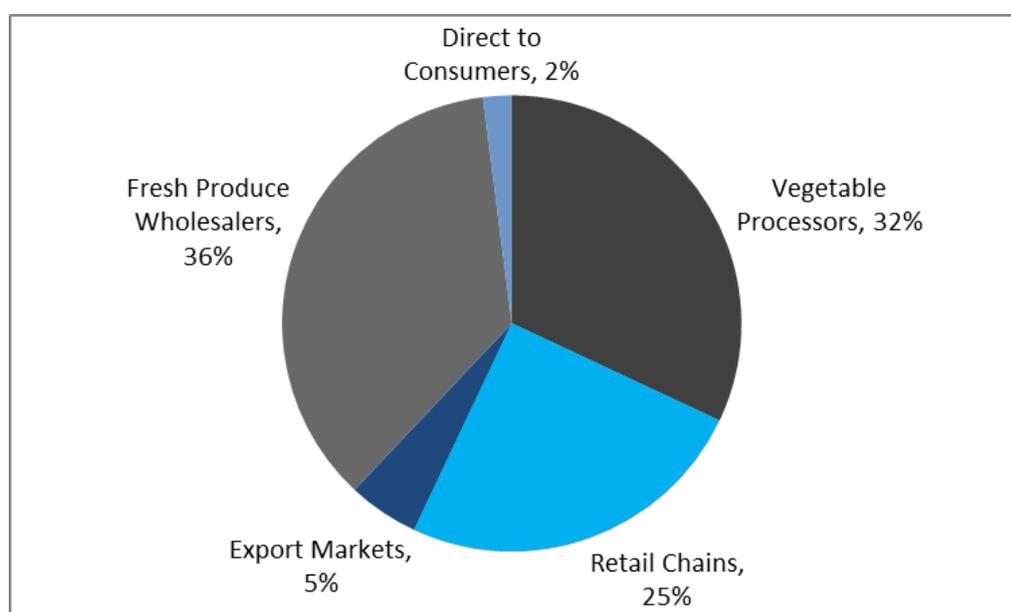
Exports valued at free-on-board (fob) basis and imports on a cost insurance freight (cif) basis. Data source: ABS, ABARE, HAL and CIE estimates.

Accordingly, it is clear from the supply chain that the vegetable industry must embrace the changing structure and influences of the downstream retail market and how they might influence the costs (and opportunities available) to growers.

## 4.4 Market segments

Analysis of the major market segmentation reveals that supply chain issues extend to retailers (who account for over a quarter of production) and wholesalers and processors (who each account for over a third of sales of the entire vegetable industry). Figure 6 illustrates the various proportions of distribution channels used by vegetable growers. For example, 2% of production is sold direct to end consumers (i.e. farmer's markets), while 25% is sold directly to retailers and 36% involves fresh produce wholesalers.

**Figure 6 - Major Market Segmentation of Australian Vegetable Industry**



Source: IBIS, February 2011

### 4.4.1 Wholesalers

Fresh produce wholesalers are the largest market for growers, and are also one of the most complex.<sup>12</sup> A report by the Commonwealth Department of Agriculture, Fisheries and Forestry has found that wholesale markets are driven by short-term pressure to sell produce that comes in, and therefore prices are often not set according to quality or consumer demand.<sup>13</sup> However, relationships between the grower and the wholesaler can have an effect on prices, with loyal growers (e.g. supplying consistent high quality goods) potentially receiving higher prices than occasional suppliers for similar quality produce. The price difference can be as high as 70%.<sup>14</sup>

Wholesalers are currently the largest suppliers of 'direct sales to retail chains',

<sup>12</sup> IBISWorld Industry Report AO113, 'Vegetable Growing in Australia', February 2011, p.18

<sup>13</sup> Ibid, p.18

<sup>14</sup> Ibid, p.18

however this is changing.

For wholesalers, retailers constitute 65% of sales, food service outlets contribute 30% and local markets account for 5%.<sup>15</sup>

#### 4.4.2 Retailers

The growing bargaining power and ongoing consolidation amongst food retail chains increases the buying power of a small number of retailers. This not only places pressure on the profit margins in the wholesale fresh produce markets, but increasingly the retailers are bypassing intermediaries and negotiating directly with farmers, placing additional pressure on the industry as a whole.<sup>16</sup>

Key large supermarket retailers have been influential in shaping the vegetable industry through a number of supply chain initiatives such as the development of quality assurance schemes, product specifications, grade standards and supply-chain management and co-ordination.

In general, many growers have not been able to understand or capitalise on this trend. This is particularly so because there are many small growers and a small percentage produce the majority of the production volume.

To date, smaller growers have had little ability to be involved in marketing or supply-chain initiatives such as better chemicals testing, storage and transfer due to their size and the sophistication of a number of these initiatives.

When selling directly to retailers, growers can benefit by avoiding wholesale fees and negotiating higher prices. Currently major supermarket retailers purchase 50-70% of their fresh produce directly from growers rather than through wholesalers.<sup>17</sup>

#### 4.4.3 Processing

Vegetable processors account for an estimated 32% of sales by vegetable farmers across the industry, but this has high variability depending on the crops. For example, tomato growers can sell up to 75% of their produce to processors.<sup>18</sup> As for leviabile vegetables, the processing sector accounts for less than 11% of the value of the industry.

Over the past five years, prices received by vegetable farmers for tomatoes and lettuce have increased, driven by increased consumer demand. In the case of lettuce

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<sup>15</sup> IBISWorld Industry Report AO113, 'Vegetable Growing in Australia', February 2011, p.18

<sup>16</sup> IBISWorld Industry Report AO113, 'Vegetable Growing in Australia', February 2011

<sup>17</sup> Ibid 2011, p.18

<sup>18</sup> Ibid, p.18



this was particularly influenced by the rise in popularity of fresh salad mixes.<sup>19</sup>

In the past five years, domestic use of vegetables for processing is thought to have decreased as a result of higher import competition and stable demand. The increase in demand for processed vegetables (e.g. salad mixes) may give a boost to local vegetable processors, which will have a positive effect on demand.<sup>20</sup> Overall however, increasing import competition is thought to have led to a fall in the volumes of processing vegetables grown by the industry and to have put downward pressure on prices.<sup>21</sup> This trend seems set to continue with the processing sector progressively consolidating operations around the world. Australia as a relatively high cost producer, with a small domestic market has not attracted investment capital and is likely to face increasing competition from imports.

#### 4.5 Workforce issues

Vegetable growers have significant workforce issues. For instance, the average age of owner/operators of Australian vegetable farms was 53 years in 2008-09 and most had an education of year 12 or less.<sup>22</sup> In 2008-09 an estimated 16% had a TAFE qualification and 13% had a university degree.<sup>23</sup>

Less young people are entering or choosing to stay in the industry over time, and many ageing farmers do not have succession plans in place. However, whilst 20% of Australian farmers expect to leave agriculture in five years' time, on average they were older (60 years) and operated a smaller holding of land (2008-09).<sup>24</sup>

Rates of participation in training courses are low, particularly as it takes time away from on-farm activities.

Additionally, levels of adoption of computers and internet by Australian farmers are low, with only 62% of farmers using a computer in 2006 (latest available data)<sup>25</sup>.

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<sup>19</sup> Ibid, p.17

<sup>20</sup> Ibid, p. 17

<sup>21</sup> IBISWorld Industry Report AO113, 'Vegetable Growing in Australia', February 2011, p.18

<sup>22</sup> ABARE, 'Australian vegetable growing farms: an economic survey 2008-09', ABARE-BRS Research report 10.12Sarah Crooks, November 2010, p. 41

<sup>23</sup> ABARE, 'Australian vegetable growing farms: an economic survey 2008-09', ABARE-BRS Research report 10.12Sarah Crooks, November 2010, p. 41

<sup>24</sup> ABARE, 'Australian vegetable growing farms: an economic survey 2008-09', ABARE-BRS Research report 10.12Sarah Crooks, November 2010, p. 41

<sup>25</sup> Dr Silvia Estrada-Flores, *Opportunities and challenges faced with emerging technologies in the Australian vegetable industry (Technology Platform 1: Supply chain and logistics)*, Project VG08087, completed June 2009, p. 3



## 4.6 Consumer demand

### 4.6.1 Changing tastes/ability to increase margins

Vegetable production has increased steadily (less than 2% per annum), which is consistent with the Australian population growth of about 1.7% over the same period; implying that per capita consumption of vegetables has remained stagnant.

Consumption of vegetables is estimated to be 162 kilograms per capita annually. However, there is still substantial room for growth with about 90% of Australians not consuming the recommended daily allowance of vegetables.<sup>26</sup>

Only 10% of the population consumes the recommended five vegetables per day; the national average estimated at two vegetables per day. According to Future Focus (2008), by targeting increases in per capita consumption, there is a potential for household demand to jump 10% by 2020.

The Australian population is estimated to grow by the 3.9 million by 2020 (a 17% increase). Without growth in per capita vegetable consumption, domestic growth is expected to largely come from this population increase.

### 4.6.2 Influence on farm-gate prices

Per Figure 5, growers, on average, capture 20-40% of the retail price, compared to average retail margins of about 40—50%. Growers' margins are further declining due to:

- rising input costs;
- rising concentration in the supermarket and grocery sector and a decline in the growers' market power along the supply chain (e.g. rising popularity of direct contracts between retailers and farmers may have resulted in increased price pressure on farmers); and
- rising costs of getting vegetables from the farm gate to wholesalers (e.g. packaging and transport costs).

Increased mechanisation however, has had a positive effect on profitability, through the resulting decline in the share of labour.

Levy investment in R&D is normally directed to improvement of crop productivity. This is paradoxical, given the fact that an increase in farm products output (either due to a good season or due to technical improvements in productivity) depresses both farm prices and on average the total income of farmers.

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<sup>26</sup> IBISWorld Industry Report AO113, 'Vegetable Growing in Australia', February 2011, p.15



Additionally, demands for some vegetables are particularly sensitive to price changes. Large increases in price can constrain demand and encourage consumption of alternative foods. Also, demand for some products can result in substitution for others.

For example, the impact of increasing the production of capsicums in Carnarvon, WA (which supplies 70% of the domestic market during July-December) was investigated in 2006. Price elasticity was used as an indicative of prices and gross margins perceived by vegetable growers. This study found that a 5 –10% increase in production at Carnarvon reduced prices to the extent of reducing gross margins to zero. It was found that the domestic market for fresh produce cannot support significant increases in production, unless demand grows accordingly.<sup>27</sup>

Many horticultural enterprises currently focus on the production of vegetables for the fresh domestic market, which traditionally provides better returns than inventory sent to processing. However, if the industry is to benefit from export markets and the increasing demands from the domestic retail market, value-adding processes may be needed and processing will become a substantial component of horticultural chains.

As previously discussed, growers find it difficult to invest in new machinery and technology; given the capital requirements and risks this imposes. This applies at both the grower's level and the processing level. Vegetable processing present low levels of on-farm annual investment in machinery and equipment per year, in comparison to the levels observed in meat processing and dairy manufacturing.

#### 4.6.3 Marketing

With stagnant growth in per capita consumption there is a need to change consumers' perceptions and sentiments of vegetables. Typically supermarkets promotions have been directed at overcoming volume bottlenecks and are not aimed at increasing vegetable consumption. Therefore category promotion aimed at increasing consumption is generally funded by the category.

The vegetable R&D levy is not able to be spent on marketing and there is no marketing levy for vegetables. Therefore advertising initiatives can only be self-funded by levy payers.

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<sup>27</sup> Dr Silvia Estrada-Flores, *Opportunities and challenges faced with emerging technologies in the Australian vegetable industry (Technology Platform 4: Value addition processes)*, Project VG08087, completed 2 June 2010: referring to research completed by Hickey et al in 2006.



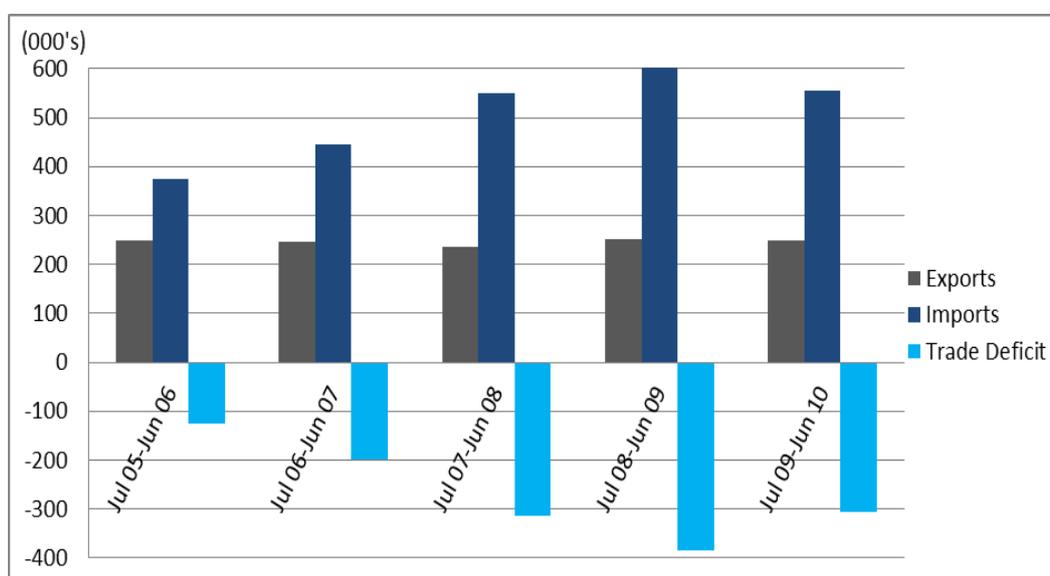
## 4.7 Globalisation

### 4.7.1 Trade balance

Compared to other cropping industries vegetable production is domestically focused. Australian vegetables make up about 85% of the domestic vegetable market (including potatoes and tomatoes) – this has declined from over 90% in 2005.

The Australian vegetable industry is facing acute challenges to its competitiveness in the global marketplace. As the following table demonstrates Australia's terms of trade in vegetables has been in decline.

**Figure 7 - Vegetable Trade Balance (2009)**



Source: ABARE statistics sourced from AUSVEG

The net trade deficit on vegetables has increased 144% from 2006 to 2010, contributed by the increase in imports by 48% over the last 4 years.

### 4.7.2 Exports

Exports have remained steady over the previous 5 years, totalling \$250 million in 2009/2010. Australian exports represent approximately 5-7% of vegetable production; with 50% of exports going to New Zealand, Japan, and Singapore (mostly fresh produce), followed by an increasing amount to U.A Emirates, Malaysia, Indonesia, Netherlands, and Germany. Exporters comprise a very small share of growers, with only 4% of vegetable farms selling offshore in 2007/2008.<sup>28</sup> There are a range of factors explaining Australia's poor export performance. An ABARE study of vegetable

<sup>28</sup> ABARE 'Management Practices on Australian Vegetable Farms'



growers' impediments to exporting is summarised in Figure 8, Impediments of Exporting; 2008-09 Survey by State.

**Figure 8: Impediments to Exporting; 2008-2009 Survey by State**

	NSW	VIC	QLD	SA	WA	TAS	NT	Aust
No Local Agents	8%	10%	12%	2%	25%	27%	24%	13%
Prices Not High Enough	32%	47%	30%	43%	41%	77%	60%	41%
Shipping Costs Too High	18%	21%	22%	18%	13%	37%	22%	21%
Transport Not Available	6%	6%	5%	3%	6%	5%	7%	5%
Infrastructure On Farm Needed	1%	24%	7%	15%	14%	43%	37%	17%
Too Hard/Time-Consuming	44%	60%	73%	68%	57%	59%	60%	60%

Source: ABARES Australian vegetable growing farms: an economic survey 2008-09, p.14

The table reveals a range of factors that limit farmers export success. In addition to costs, export capability and networks were a significant issue.

Exports do however represent a significant lost opportunity because global markets and trade for horticultural products is growing each year at an equivalent rate to Australia's entire horticultural output. Most of this growth is coming from Asian economies which also have a burgeoning middle and upper class seeking high quality produce. Exports are also particularly beneficial as they do not suppress domestic prices and provide a scale of production which further encourages exports and defends against imports.

Despite the attractiveness of exporting, Australia's ability to successfully access export markets at the present time is limited by not only growers' capability but also the following key issues:

- Increasing competition in horticulture production has caused deterioration of export markets for Australian vegetables – e.g. China, Chile, South Africa ('clean and green' is no longer a differentiator for Australia in production).
- Exchange rate movements over the prior two years have made Australian goods approximately one-third more expensive in export markets.<sup>29</sup>
- Imports of processed vegetable products are rising, substituting home grown vegetable products.

<sup>29</sup> [www.Oanda.com](http://www.Oanda.com) historical rate analysis; AUD to USD since July 2009



- Most levy payers do not have the scale, quality assurance processes, market knowledge or capability to access international markets.
- Large global retailers forward plan their requirements to secure supply – ‘category managers’ therefore are powerful, while smaller suppliers (like Australia) have more difficulty interfacing with them.
- New storage technologies mean that overseas competitors are able to store fresh food longer - seasonal supply advantages in Australia are weaker and import threats increase.
- High direct (e.g. tariff barriers) and indirect (e.g. quarantine restrictions) barriers to trade exist – which makes access to key export markets difficult (e.g. China, India).

As a result, Australian exporters need to improve their value proposition in existing export markets if they are to stem the decline in their market share. However, the global market and demand, particularly Chinese demand, for agricultural produce is likely to drive an increase in export market opportunities and vegetable prices in the future (see Bloomberg article box below). The question is how Australian vegetable farmers can position themselves to be able to supply on a scale and consistency required and as understand the market dynamics.

**Bloomberg News, 19 April 2011: China Crops in Short Supply as Fewer Farms Spur Food Prices**

Across the road from Zhao Yuanyi’s wheat field in China’s Shandong province, Chonche Group is expanding a rail-car factory on what used to be 227 hectares of farms. Nearby, Geely Automobile Holdings Ltd. makes sedans on an 87 hectare site that four years ago was covered by crops.

The factories sprawling from Jinan city, 350 kilometers (220 miles) south of Beijing, put Zhao on the front line of a clash between a policy of food self-sufficiency and industrial growth that made China the world’s second-biggest economy. Industrialization is winning, signaling prices for crops like wheat and corn will rise as China is increasingly unable to feed itself and vies for supplies on global markets.

“This year, maybe next, they’ll develop my field,” Zhao, 63, explains as he stands beneath a China Mobile Ltd. cell-phone tower on the edge of the land he’s tended all his life. The local government will buy his land, paying compensation through an annual allowance of 1,800 yuan (\$276) per mu, which amounts to about 2,700 yuan for each person in the village.

China’s farmland shrank by 8.33 million hectares (20.6 million acres) in the past 12 years, Premier Wen Jiabao’s top agriculture adviser Chen Xiwen told reporters March 24. Land under cultivation has already fallen almost to the government’s 120 million hectare limit after being consumed by apartments, factories, desertification and a forestation campaign. Drought has also hit the country’s main wheat-growing region.



“China’s increased demand for agricultural commodities will mean an increase in prices for the entire world market,” said David Stroud, chief executive officer of New York-based hedge fund TS Capital Partners. “China can outlast any other bidders for the commodities it desires.”

Investors should bet on crops in shortest supply in China, with wheat and corn offering the best opportunities, he said.

Wheat futures in Chicago may average \$8.05 a bushel this quarter, 89 percent higher than the past year’s low, as farmers struggle to rebuild global stockpiles, according to Rabobank International’s Agri Commodities Monthly e-mailed April 18. Corn futures may reach a record, jumping to as high as \$10 a bushel, Alex Bos, an analyst at Macquarie Group Ltd. said April 6.

“As China continues to grow, demand and supply will struggle to keep up,” said Abah Ofon, a Singapore-based commodities analyst at Standard Chartered Plc. “This would be a problem for any country. For China, the world’s biggest consumer and producer, a small deficit can result in huge demand for imports.”

A 5 percent shortfall in China’s overall grain harvest would potentially require 20 percent of current global grain exports to meet the country’s annual needs, Ofon said. Wheat in Chicago reached its highest level since 2008 in February on concern drought was damaging China’s crop, raising the risk the country would drain the world market.

Rising food prices cause riots and civil conflict, and widen the gap between rich and poor, according to an International Monetary Fund working paper by economists Rabah Arezki and Markus Brueckner published last month on the organization’s website. World Bank President Robert Zoellick said in February that the price surge was “an aggravating factor” in uprisings sweeping the Middle East.

Hong Kong-listed Geely and closely held Chonche are using land that China needs to offset shortfalls in more developed areas. The spread of cities and factories in wetter grain-growing coastal regions such as Jiangsu and Zhejiang has put more pressure on drier provinces like Hebei and Shandong.

“Food production is increasingly being focused in northern areas that have water shortages,” agricultural adviser Chen wrote in December. That’s “very worrying for food security.”

Source: Bloomberg, editors responsible for this story: Peter Hirschberg at phirschberg@bloomberg.net James Poole at jpoole4@bloomberg.net

#### 4.7.3 Imports

Between 2005/2006 and 2009/2010 the value of vegetable imports has grown 48%, now making up 15% of total industry value (up from 12% in 2005/2006). The largest imported product category is the processed vegetables; growing 44% over the aforementioned 4 years and making up 37% of all imports. Frozen vegetables is a close second, but growing fastest at 62% over 4 years.



**Figure 9 - Import by Product Group**

	<b>Jul 09-Jun 10 Value</b>	<b>Share of Imports Value</b>	<b>4-Year Growth in Value</b>
Fresh	\$58m	10%	40%
Frozen	\$184m	33%	62%
Processed	\$208m	37%	44%
Other (Seed & Dried)	\$105m	19%	40%
<b>Total (\$million)</b>	<b>\$556m</b>	<b>100%</b>	<b>48%</b>

*Source: Australian Bureau of Statistics/World Trade Atlas; presented on [www.AUSVEG.com.au](http://www.AUSVEG.com.au)*

Although fresh vegetables are the largest category consumed in Australia, imported fresh vegetables is the smallest category at only 10% of all imports and mainly consisting of garlic, asparagus, and onions; which are not included in the national vegetable levy. The remaining 19% of imports consist of seeds, tubers, and dried and provisionally preserved vegetables. Analysis demonstrated that, although imports are increasing across all high-level categories, the growth is over a relatively small base when compared to the size of the domestic market.

In 2009/2010 the leading importers of vegetables were New Zealand, China, and Italy; with China and Italy growing 77% and 60% respectively over the previous 4 years. New Zealand is the clear leader of imported Frozen vegetables to Australia (49% of total value) while Italy provides 41% of all Processed vegetables (mostly processed tomatoes). China, Netherlands, and The United States dominated the Other Vegetables category, while Fresh vegetables were predominantly sourced from China, New Zealand, and The United States. Countries with the highest growth in imports to Australia since 2005/2006 include Netherlands (Frozen and Other), China (in Frozen and Processed), Canada (in Frozen), The United States (in Frozen), and Mexico (in Fresh produce).

**Figure 10 - Import Values by Country**

Rank	Country	Share of Imports Value	4-Year Growth
1	New Zealand	20%	6%
2	China	17%	77%
3	Italy	16%	60%
4	United States	8%	33%
5	Netherlands	7%	105%

Source: Australian Bureau of Statistics/World Trade Atlas; presented on [www.AUSVEG.com.au](http://www.AUSVEG.com.au)

**Figure 11 - Frozen Imports Values by Country**

Rank	Country	Frozen Imports Value Share	Jul 09-Jun 10 Value	4-year Growth
1	New Zealand	49%	\$89m	15%
2	China	17%	\$31m	133%
3	Netherlands	10%	\$19m	142%
4	Canada	7%	\$12m	1755%
5	Belgium	6%	\$11m	163%
6	United States	6%	\$11m	235%

Source: Australian Bureau of Statistics/World Trade Atlas; presented on [www.AUSVEG.com.au](http://www.AUSVEG.com.au)

**Figure 12 - Processed Import Values by Country**

Rank	Country	Processed Imports value Share	Jul 09-Jun 10 Processed Value	4-Year Growth
1	Italy	41%	\$86m	62%
2	China	14%	\$29m	58%
3	United States	7%	\$14m	63%
4	Turkey	6%	\$12m	54%
5	Thailand	6%	\$12m	35%

Source: Australian Bureau of Statistics/World Trade Atlas; presented on [www.AUSVEG.com.au](http://www.AUSVEG.com.au)

**Figure 13 - Fresh Import Values by Country**

Rank	Country	Fresh Imports Value Share	Jul 09-Jun 10 Value	4-Year Growth
1	China	32%	\$19m	67%
2	New Zealand	20%	\$11m	-29%
3	United States	12%	\$7m	94%
4	Peru	9%	\$5m	90%
5	Mexico	9%	\$5m	486%

*Source: Australian Bureau of Statistics/World Trade Atlas; presented on [www.AUSVEG.com.au](http://www.AUSVEG.com.au)*

Although it has a large and growing population, China is still able to produce vegetable products for export; focusing less on grains and more on highly profitable fruits and vegetables. China's comparative advantage to Australia does not come from having more land but from having a vast supply of cheap labour. As agriculture tends to be a high labour intensive industry, China has shifted many resources to the industry over the last decade. China focuses its export crops on the more labour intensive crops like garlic (4% of total imports) and mushrooms.

Australia is a minor vegetable producer when compared to countries like China and the United States. Chinese vegetable production in 2005/2006 is estimated at 550 million tonnes compared to Australia's 3 million tonnes (ABS). The Chinese population requires large domestic production in order to sustain itself; which allows China to grow enough scale to make export chains profitable.

Frozen and Processed vegetables contribute 70% of the value of imported vegetables, with 16% of all imports being frozen from NZ and 15% processed in Italy alone. This 70% outweighs fresh vegetables partly because of the cheaper supply chain needed but also because of the higher prices of processed and frozen products. Frozen and processed foods are more than ever demanded by food retailers and the food service industry. Australia's shortage of capabilities and competition within the processed and frozen foods industry means buyers are seeking cheaper alternatives internationally. International food processors source their vegetables locally; thereby cutting Australian farmers out of this growing sector.

The following figures summarise key imports by product by vegetable sector.

**Figure 14 - Frozen Imports by Product**

Rank		Value Share	09/10 Value	4-Year Growth
1	Prepared Potatoes	41%	\$76m	300%
2	Mixture of Vegetables	19%	\$35m	33%
3	Peas	10%	\$18m	6%
4	Sweet Corn	7%	\$12m	-11%
5	Prepared Vegetables Other Than Potatoes	5%	\$10m	40%
6	Beans	4%	\$78m	27%
7	Spinach	4%	\$6m	31%

Source: Australian Bureau of Statistics/World Trade Atlas; presented on [www.AUSVEG.com.au](http://www.AUSVEG.com.au)

**Figure 15 - Processed Imports by Product**

Rank		Value Share	09/10 Value	4-Year Growth
1	Tomatoes	29%	\$60m	73%
2	Prepared Tomatoes	15%	\$31m	85%
3	Potatoes	7%	\$15m	39%
4	Tomato Sauces	7%	\$14m	36%
5	Sweet Corn	4%	\$8m	62%

Source: Australian Bureau of Statistics/World Trade Atlas; presented on [www.AUSVEG.com.au](http://www.AUSVEG.com.au)

**Figure 16 - Fresh Imports by Product**

Rank		Value Share	09/10 Value	4-Year Growth
1	Garlic	37%	\$21m	100%
2	Asparagus	16%	\$9m	63%
3	Onions/Shallots	14%	\$8m	69%
4	Capsicum	10%	\$6m	-39%
5	Peas	8%	\$4m	74%
6	Mushrooms/Truffles	6%	3.42	189%

Source: Australian Bureau of Statistics/World Trade Atlas; presented on [www.AUSVEG.com.au](http://www.AUSVEG.com.au)

## 4.8 Climate change and sustainability

### 4.8.1 Climate change

Climate change leads to extreme weather events; which, in theory result in more weather variability, heat stress and lack of chilling hours, major crop losses from severe weather events, increased risks of exotic disease incursions and changes in the distribution of pests and diseases.

### 4.8.2 Sustainability

The world is urbanising at a very rapid rate. This century saw for the first time more people living in cities than rural area. At present, 55% of the world's population resides in urban areas<sup>30</sup>. As a consequence, arable land is decreasing at the same time consumption is increasing due to global population growth. Additionally, fresh water is being used at a greater rate so that urban demand for fresh water is now outpacing rural demand. This reduces the amount of water available for food production.

Along-side this are other pressures on available land, water and other inputs for food production. Trends that are affecting global food security include:

- greater urban demand reducing surface water availability;
- groundwater quality, quantity and accessibility is in decline;
- arable land is declining in availability;
- soil loss is increasing;
- increasing soil degradation;
- biofuels are replacing food crops;
- the risks of drought are increasing;
- agricultural research is in decline worldwide; and
- nutritional levels and incomes are increasing, placing greater demand for food.

### 4.8.3 Chemicals/pest management

Increasing regulation in the use of chemical pesticides, the promotion of integrated pest-management, the pressure from export markets demanding chemical-free foods and the consumers' growing awareness to health and environmental issues created by chemical pesticides means that there may be requirements to consider alternatives to chemical pesticides. A recent CSIRO study developed baseline scenarios for emergency plant pests (EPP) relevant to the vegetable industry. If these scenarios become a

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<sup>30</sup> Professor Colin Fudge, Pro Vice Chancellor (Design) RMIT University, 16 March, 2011.



reality, this would cost the industry and government \$2.4billion – representing 7 to 12 times the investment needed to bring a new crop protection product to the market. Given the significant lead times and costs associated with developing new chemical fertilisers (e.g. the approval phase in Australia can take 12-18 months) this is a significant ongoing issue for the industry.



**Figure 17 - Summary list of Vegetables included and excluded from the Levy**

<b>Leviabale Vegetables</b>	<b>Vegetables Excluded from Levy</b>
Carrots	Potatoes
Pumpkins	Potatoes – frozen
Sweet corn	Onions
Peas and beans	Tomatoes – processing
Lettuce	Tomatoes – fresh
Broccoli	Tomatoes – canned
Cauliflower	Asparagus
Capsicums	Mushrooms
Other vegetables	Other processed vegetables

The Australian Government Levies Revenue Service (LRS) collects the vegetable levy. When the R&D levy funds are being spent they are matched by the federal government.

Horticulture Australia Limited (HAL) is responsible for managing industry funds and the Australian Government matches the levy dollar-for-dollar as it is spent on R&D projects.

It is the industry’s responsibility to recommend via the Vegetable Industry Advisory Committee (IAC) how funds should be invested. The IAC makes recommendations to HAL about which R&D projects should be funded by the levies, in accordance with industry priorities.

AUSVEG represents the interests of growers, and AUSVEG’s role in the levy investment process includes recommending to HAL the composition of the Vegetable Industry Advisory Committee (IAC) and participation in IAC discussions by acting as an ex-officio member of the IAC. AUSVEG also helps to develop the agenda for the IAC, Working and Advisory Group meetings and recording and driving the actions that arise from the meetings. In addition, AUSVEG and HAL undertake a high level of dialogue on a continuing basis on issues such as R&D projects being undertaken.

## 5.2 How is R&D levy spending allocated?

Vegetable levy funds are to be invested in accordance with the HAL constitution. ‘Research and Development’ is broadly defined in the HAL Constitution<sup>31</sup> as “*systematic experimentation or analysis in any field of science, technology, economics and business (including the study of a social or environmental consequences of the adoption of a new technology) carried out with the object of:*

- a) *acquiring knowledge for the purpose of obtaining or furthering an objective of the Industry, including knowledge that may be of use in improving any aspect of the production, processing, storage, transport or marketing of horticulture products or goods that are derived from them; or*
- b) *applying knowledge for the purpose referred to in paragraph (a).”*

All projects seeking matched funding from the Australian Government must align with the Australian Government National and Rural Research and Development priorities. These are:

- **Productivity and Adding Value:** Improve the productivity and profitability of existing industries and support the development of viable new industries.
- **Supply Chain and Markets:** Better understand and respond to domestic and international market and consumer requirements and improve the flow of such information through the whole supply chain, including to consumers.
- **Natural Resource Management:** Support effective management of Australia’s natural resources to ensure primary industries are both economically and environmentally sustainable.
- **Climate Variability and Climate Change:** Build resilience to climate variability and adapt to and mitigate the effects of climate change.
- **Biosecurity:** Protect Australia’s community, primary industries and environment from biosecurity threats.

The government also outlines the activities that are supporting the Rural Research and Development Priorities:

- **Innovation Skills:** Improve the skills to undertake research and apply its findings.
- **Technology: Promote** the development of new and existing technologies.

HAL has an overarching approach to its decision making process for R&D levy investment which follows Australian National Audit Office best practice principles for managing industry and publicly funded R&D. It includes four steps:

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<sup>31</sup> HAL Constitution, 19 November 2009.

- identification of the strategic directions and priorities (Industry Strategic Investment Plan and Annual Priorities);
- assessment of project options against strategic directions and priorities (provided to HAL in Annual Investment Plan);
- engagement and participation of industry in R&D project prioritisation and selection (through Industry Advisory Committees); and
- reporting on investment outcomes (Annual Reports, annual levy payer meetings).

To ensure each industry's levy investments meet the specific needs of the respective industry, the HAL Constitution specifies that three core documents and activities need to be developed, the:

- Strategic Investment Plan (SIP);
- Annual Investment Plan; and
- Annual Report and Annual Levy Payers meeting.

The development of the SIP is undertaken by the peak industry body (PIB) with input from the IAC, and submitted to HAL for approval. This White Paper therefore outlines the development of the SIP, which will guide the decision-making process for R&D levy investment. The next sections of the report analyse the vision for the industry and the strategic priorities and programs for the industry that will make up the vegetable industry's Strategic Plan and then analyses how the R&D levy can be spent to underpin the Strategic Plan.

## 6. What is the vision for the performance of the vegetable industry?

### 6.1 VegVision 2020

VegVision 2020 established the vision for the industry back in 2006 its objective - *“to double the 2006 value of fresh, processed and packaged vegetables in real terms by stimulating and meeting consumer preferences for Australian products in domestic and global markets”* - provided direct and tangible measures of industry performance.

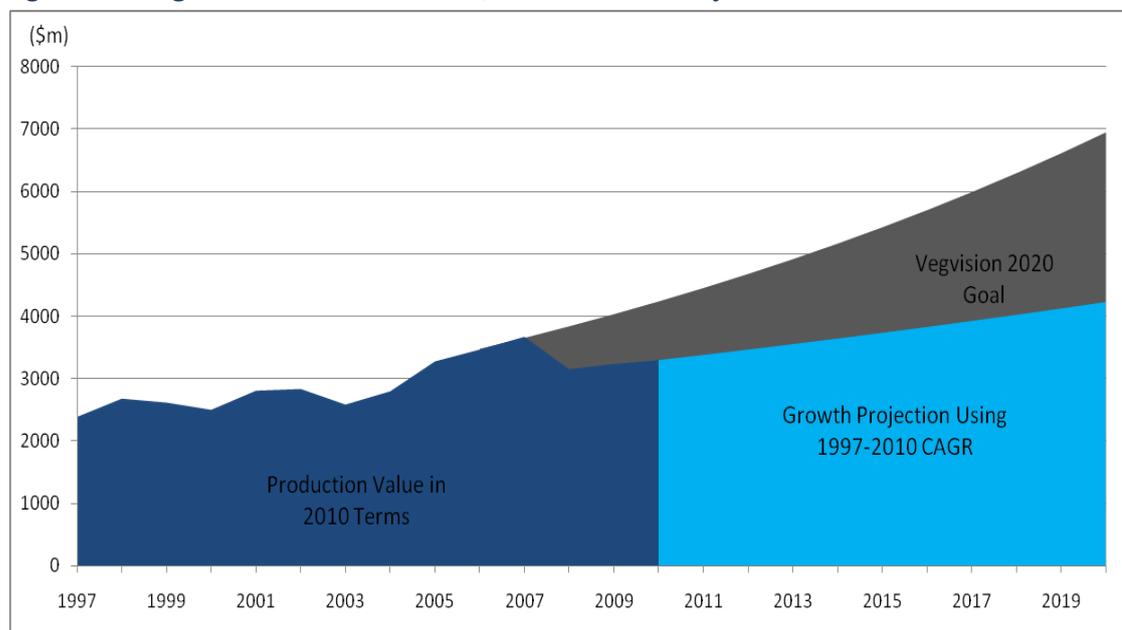
The industry value has grown significantly since 2006 but mainly as a result of spikes in production costs and external events such as drought (see previous discussion above). Overall, profitability has shrunk. Therefore, industry revenue or value may not be the only or most appropriate measure of success for the industry.

Therefore, it may be more appropriate to establish a vision with an accompanying system of metrics for gauging progress toward the goals that support its vision. For example, a question we may ask is 'are levy payers more interested in doubling vegetable value or is a better return on capital more ideal for them?'

The real Compound Annual Growth Rate (CAGR) for vegetable farm gate value since 1997 has been 2.5%. Since the adoption of VegVision 2020 in 2006, the CAGR has declined to 0.1%. However, the 14% decline in vegetable value in 2008 was considered an outlier when analysing this figure. Eliminating 2008 from the analysis results in a 2006-2010 CAGR of 4%; comparable to the CAGR of years prior to the adoption of VegVision 2020. As such, CAGR for years 1997-2010 was used to project years 2011-2020. This was then compared to VegVision's goal of doubling real term value.

In order to meet this goal of VegVision 2020, the industry would need to grow roughly 5% each year since 2006. Given that the last four years have seen an annual growth rate of less than 1%, the industry is significantly off course. Figure 18 illustrates the industry's historical growth (in 2010 AUD terms) and uses this to forecast vegetable production value to 2020.

**Figure 18 - Vegetable Production Value; Historical and Projected**



*Source: Farm gate value obtained from ABS. All figures adjusted for inflation using 2010 as a base.*

As mentioned previously, despite the growth in the value of production, this has not coincided with a corresponding growth in profitability to the industry or to the levy paying growers.

## 6.2 A vision for the industry

The industry vision must be clearly defined before a viable strategy can be established to guide the industry’s R&D investment. The industry objectives related to the strategy then determine the KPIs needed to define the areas that require strategic focus (i.e. industry priorities). Although, qualitative indicators are helpful in understanding what areas drive success, ultimately quantitative KPIs are needed to reveal the current state of the industry and measure industry progress toward the determined key industry objectives.



Industry analysis and results of numerous interviews and focus groups have revealed that the vision for the vegetable industry, from the perspective of the levy paying grower can be summed into a visionary sentence:

***“To be a cohesive, sustainable and highly efficient industry focused on growing demand profitably”.***

The vision stresses that the industry is not only concerned with growth in vegetable production and value, but more importantly, growth in profitability to farmers. It also considers the necessity to improve the industry’s sustainability long into the future. Both of these aspects can only be achieved through a more focused, structured and cohesive industry.

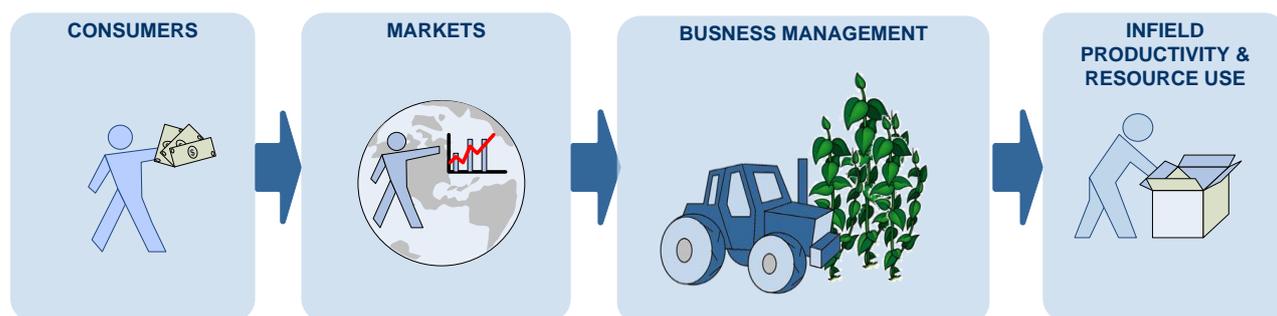
**Recommendation 1: The vegetable industry adopts the following vision: *“To be a cohesive, sustainable and highly efficient industry focused on growing demand profitably”.***

## 7. What are the key strategic priorities for the vegetable industry?

### 7.1 Key strategic priorities for the Strategic Plan

The common strategic themes/challenges outlined above have been synthesised and refined on the basis of input from levy payer meetings, interviews, focus group discussion, discussions and input from AUSVEG and HAL and a literature review. This has led to the development of the following research priorities and programs which will form the basis of the Strategic Plan.

Key strategic priorities have been identified on the basis that they will drive the performance of the industry and in addition may, where appropriate, form the basis of future R&D expenditure in the years to come. The core strategic priorities are intended to capture the key aspects of the vegetable industry supply chain, from vegetable consumers, to markets, to production, and through to production inputs.



The strategic objectives of the industry have been identified as follows:

1. **Consumer Alignment:** This area focuses on increasing domestic and global consumer demand, as well as how much consumers value Australian vegetable products. The idea is to begin with research into understanding the needs and preferences of vegetable consumers and investing in projects (on and off the farms) necessary to deliver products that best meet consumers' expectations while also educating the market about the value offered by the industry. **Past Examples:** *Sweet potato retail and marketing survey; Tracking consumer preferences; Nutrient labelling for packaged baby leaf spinach and rocket.*
2. **Market and value chain development:** This area relates to the development of value adding processes and both domestic and international supply chains. The ability for levy payers to be competitive in the vegetable market depends on a range of issues such as value-adding capabilities, access to vegetable markets, and export and import competition. Vegetable markets need to expand to grow the value of the industry and

developed properly to capture a larger portion of this value for growers. **Past Examples:** *Proving WA is PCN free; Provisional MRLs in Japan and Taiwan; Optimal irradiation for sterilising Q-flies.*

- 3. Business Management:** This area involves developing innovative techniques and technologies to improve on-farm production efficiencies. This will be supported by improved farm management approaches. The ability for vegetable growers to get better at what they do is crucial for being profitable domestically and internationally, as well as for competing with imported products. **Past Examples:** *Wastewater recycling improves grower returns; Broccoli uniformity improved for mechanical harvesting; Training courses to up-skill management.*
- 4. In-field productivity & resource use<sup>32</sup>:** This area involves the ability for growers to defend themselves against threats involving the inputs needed for production on the farm. This includes threats like the rising costs of inputs, the effects of variable climates, water and soil shortages, emerging pests and disease and identifying new labour saving technologies. **Past Examples:** *IPM Strategies for Silverleaf whitefly; Combined strategies to control cucumber diseases; Control strategies for Sclerotinia and Rhizoctonia, Developing a mechanised harvester for Brassica seed crops.*

Figure 19 is a detailed illustration of the strategic priority categories and examples of the significant R&D project topics that might fall into each category. It is important to note that projects topics can potentially fit into several priority categories because priorities represent the key objective to the industry rather than the topic of research. The strategic priorities will also be supported by an industry development function (or “Drive Train”) to ensure the development and extension of the Strategic Plan is maximised.

**Recommendation 2: The industry adopts the following four key strategic priorities: consumer alignment; market & value chain development, business management and In-field productivity & resource use. The industry should also adopt an industry development drive train to support the functions for achieving these objectives.**

This section analyses and explains the strategic priorities and programs in more detail and assists in understanding the opportunities for programs in the different areas. These programs are not intended to be an exhaustive list, but are examples of the types of projects that were identified through the course of the review of the industry. Some programs may form a starting point for the development of future levy funded projects whilst others might not easily fit into the R&D levy funding process and might instead be undertaken by the PIB

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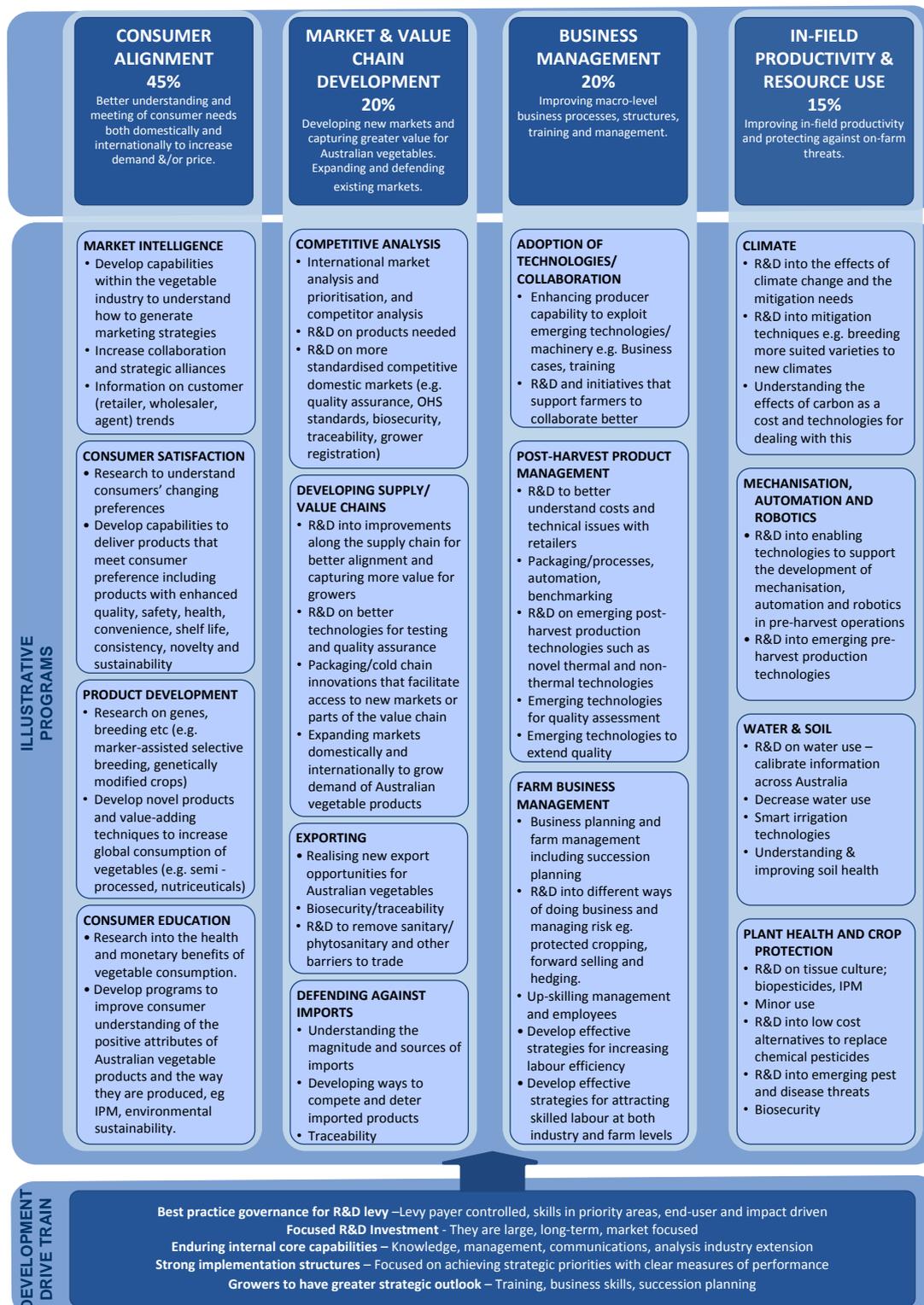
<sup>32</sup> The four strategic priority areas and supporting illustrative programs have in part been refined by AUSVEG and HAL at the request of the IAC and are likely to be refined further following the feedback period.



on behalf of the vegetable industry or by growers using private or voluntary contributions.

Section 9 provides impact modelling of the strategic priorities and the potential impacts of the illustrative programs that have been identified. The section also identifies the proportions of R&D levy spending that should occur in each priority area.

Figure 19: Strategic Priorities and Illustrative Programs



## 7.2 Consumer Alignment

This priority's objective is increasing consumer demand and prices for vegetable products on a global scale. This is achieved through increasing domestic per capita consumption, increasing international interest in Australian vegetable products, and improving the value of Australian vegetables in all consumers' minds. Projects in this category will research consumers' habits and preferences, as well as go on-farm to develop both new and improved products that meet the needs of vegetables consumers globally.

### 7.2.1 Opportunities to capture changing consumer needs and tastes

Consumer tastes are evolving, with greater focus on, quality, convenience, and taste.

There is scope to increase both the volume and the value of Australian vegetable products consumed by domestic consumers. Improving quality and consistency, managing volumes, and the like, are entry-level requirements – without them any other strategies to impact demand (e.g. through marketing) are limited.

Rather than only competing on cost, novel, distinctive and quality products need to be produced over which there is some influence in the market place. For instance, new functional health food products can gain premiums of 30% to 500% above comparable conventional foods.<sup>33</sup> Quality, convenience, novelty, variety, health, 'clean', green and brands are increasingly important to consumers – i.e. new functional health food products can attract price premiums. Some methods of doing this include:

- increase the capacity of the vegetable supply chain and processing to provide products to consumers that are perceived as more valuable;
- assess alternative distribution channels can be explored to improve the recognition of Australian products;
- increasing forward contracting which successfully aligns demand and supply and quality factors;
- increased technology use can improve cool-storage, packaging and handling techniques;
- organisational efficiency can control costs and quality (e.g. turnover stock faster and reduce waste, economise on shelf-space, present products in their best light); and
- producing new, novel and differentiating products.

The majority of levy investment has been directed at maintaining and increasing

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<sup>33</sup> The Australian Horticulture Plan: Future Focus, *Implementation: Stage 3 Report*, December 2008, p. 10



crop yields – which has typically served to increase production and depress prices, offsetting most efficiency gains.

However, new product innovation is a high risk activity; each year, Australasian supermarkets are typically offered between 5 thousand and 10 thousand new products, but only around 10% are accepted to be displayed on shelves<sup>34</sup>. Further, less than 1% of those products are still on the shelves after 5 years of their introduction. Factors that decrease the level of risk in new product development and innovation include the size and type of organisation and the existence of collaborative networks. The establishment of consortia for such research could be used – this is a central concept to both European and American approaches in this area.

New Zealand has successfully innovated to develop novel products. An example is apples and kiwifruit devoting \$40 million to map the gene sequences for both products. These genetic maps allow breeders to target traits like shape, flavour, colour and vitamin content.<sup>35</sup> For example, the development of Gold kiwifruit incurred R&D costs of \$20 million with market development costs of \$50 million. In 2009 total gross revenues were approximately \$1 billion with the product having a significant price premium over green kiwifruit.<sup>36</sup>

Australia is a world leader in breeding and genetics of plants. This expertise could be valuable and directed at developing novel and distinctive products. However, Australia will not be able to export all products, but should specialise in those where it can gain particular distinctiveness, scale and advantage. At present, Australia has built scale in nuts, olives, avocados, citrus, mangoes and some vegetables.

Increased urban population coupled with an increased awareness in the impact of food chains on the environment will lead to the development of new food chains (e.g. growers can re-develop farmers' markets chains, direct grower-urban consumer chains and local /regional chains).

Understanding what consumers are willing to pay and understanding how product differentiation can be achieved provides growers with more ability to control prices at the farm gate.

Additionally, trends in consumers' tastes need to be accommodated if growers are expected to maintain or increase the premiums commanded. The increased reliance on quick and easy meals by consumers has increased the demand for processed vegetables, including processed fresh vegetables (e.g. salad mixes).

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<sup>34</sup> Dr Silvia Estrada-Flores, *Opportunities and challenges faced with emerging technologies in the Australian vegetable industry (Technology Platform 4: Value addition processes)*, Project VG08087, completed 2 June 2010, p. 3

<sup>35</sup> The Australian Horticulture Plan: Future Focus, *Implementation: Stage 3 Report*, December 2008, p. 10

<sup>36</sup> The Australian Horticulture Plan: Future Focus, *Implementation: Stage 3 Report*, December 2008, p.44



Additionally, retailers are demanding products that will appeal to this changing consumer tastes. For example, IBISWorld reports that retailers have reportedly indicated to greenhouse producers that they would like to increase the proportion of greenhouse tomatoes in stores from the current level of 17% up to 50% of tomato stocks. Whilst tomatoes are not leviable vegetables under the vegetable R&D levy, other vegetables, such as lettuce, cucumber and capsicum are expected to follow.<sup>37</sup>

#### **Consumer demand – example of pork industry**

Consumer research in the pork industry has generated significant benefits. Using the results of consumer R&D projects, national account managers in Australian Pork Ltd successfully engaged with decision-makers in major supermarkets, the food service industry and supply chain firms. The understanding, interpretation and application of these consumer insights were fundamental in the development and national supply of new products (e.g. boneless rolled products with flavour enhancers) and in establishing new partnerships (e.g. with a global Fast Moving Consumer Goods company for a new range of sauces for pork meals). These innovations supported strong growth in domestic market share for fresh pork, relative to other meat products.

*Source: VIDNA Phase III report (VIDP reports) page 9*

A shift in the strategic thinking and long-term focus for projects is required. As highlighted by the sweet potato industry development from 2000 to 2010 (see box below), a focus on identifying the needs of consumers (retail and end-consumers) can guide project decision-making in the long-term. A focus on consumers can therefore create a more strategic alignment with goals and a vision for a particular vegetable crop or for vegetable industry goals.

The Australian sweet potato industry is represented by the Australian Sweetpotato Growers Association (ASPG Inc.). Since inception, ASPG has attracted more than 80 financial members, representing over 90% of Australia's production.

In 2000 the sweet potato industry was worth approximately \$7 million (407 thousand packages) and in 2010 it is estimated that farm-gate value is approximately \$60 million annually (3.5 million packages).<sup>38</sup> During that time, approximately \$1 million vegetable R&D levy has been invested in the sweet potato research (as identified in the Box below) with approximately \$1 million investment by Queensland government in salaries for researchers working on the projects.

Additional inputs have included the in-kind contributions of the sweet potato farmers who have provided considerable time to the project. Additionally, the industry incurs

<sup>37</sup> Suzannah Rowley, IBISWorld Industry Report A0113, 'Vegetable Growing in Australia', February 2011, p. 10

<sup>38</sup> Australian Sweetpotato Growers Association (ASPG Inc.) estimates.



direct annual private costs of investment in the new technologies that are developed (over \$1 million p.a.).

Whilst other factors have also contributed to the growth in this industry (e.g. preference for sweet potatoes compared to potatoes because of its low GI and taste), the sweet potato levy payers strongly believe that the R&D levy research has been a key contributing factor to the success of the industry over the last ten years.

The participants in the ASPG identified some key success factors that enabled the sweet potato R&D levy projects to work:

- a long-term strategic mindset – driven by an overall goal (e.g. to do research to meet consumers' needs);
- a commitment and co-operation from members that represent around 85% of Australia's sweet potato production – and the creation of a group ASPG which unifies the voice, issues and messages of the sweet potato industry;
- research is being driven by the ideas of the end-users/levy payers;
- a willingness for levy payers and researchers to meet and share information on a regular basis – both formal and informal;
- strong and regular participation by all industry leaders – and a willingness to meet with stakeholders across the industry to drive sweet potato issues;
- a dedicated researcher who works exclusively for sweet potato research and who is willing and capable to span different research areas, to work on-farm and take a long-term strategic view;
- the provision by end-users of considerable time and also resources (e.g. their farms) to enable research to be conducted;
- constant communication and participation by end-users and researchers which means that outcomes are readily understood and applied on-farm in a timely way; and
- development of a newsletter to facilitate communication of sweet potato information.

A key learning from the success of the use of the R&D levy funds, is that research to meet or increase consumer demand is not limited to 'consumer surveys' and may involve research into farming and production techniques. However, there is an overall strategic objective guiding the research and the end-users are driving the needs and outcomes of the research.

This approach requires not only a mind-set shift for researchers and levy payers who need to be guided by strategic outcomes, but, for HAL funding techniques. Project funding driven by a goal to meet a certain consumer expectation (e.g. easy to peel) may need to be flexible enough to accommodate new approaches and directions of research as issues arise over the long-term.

Given the impacts that can be achieved through focusing strategically on what consumers want, it is important that various end-users develop strategic R&D projects that have an overall strategy towards increasing consumer demand.

**Consumer demand – examples of the use of R&D levy funding in the sweet potato industry**

HAL project VG010 – Sweet potato retail and marketing survey (2000)/crop nutrition/agronomy

- Survey of the major wholesalers and retailers across the eastern seaboard found that the biggest limiting factor to the expansion of the sweetpotato category was inconsistent supply of even shaped smooth skinned sweetpotato.
- This set the direction for the research conducted over the next decade.
- Sweetpotato viruses in planting material were found to be the major agronomic factor limiting the production of even shaped smooth skinned high yielding sweetpotato
- Major Program for the extension of PT technology to industry. 100% of industry now introduce first generation virus free planting material into their enterprises annually. Some of the largest sweetpotato enterprises attempt to source 100% of their plant material from first generation virus free stock annually.
- Major project outcome also quantified the ideal rates of fertiliser required for crop development. The result was a reduction in Nitrogen usage from an average of 200 units per hectare to 100 units per hectare.

HAL project VG02114 (2003) - Development of smooth skinned easy to peel sweetpotato (Crop physiology/planting techniques/irrigation)

- Major project outcomes quantified the influence of planting material on yield potential of Beauregard. This has led to approximately 75% of industry cutting planting material out of seed beds rather than cutting vine out of paddock.
- The project was able to quantify the impact that moisture stress early in the crops development cycle has on yield potential. Industry is now approximately 95% irrigated using trickle or sub-surface drip.
- It also quantified the impact of planting technique on yield potential. This resulted in 100% of industry now planting by hand or by the use of machine planting techniques.

HAL project VG05037 (2006) – Improved management of sweetpotato soil insects

- In 2006 the industry identified that soil insect pests were the major cause of market failure for the sweetpotato category. If the category was to continually expand it needed to be able to consistently supply high quality blemish free sweetpotato into the



market place.

- Major project outcomes were the approval of minor use permits and label registrations for the control of wireworm and root knot nematode in the sweetpotato crop.
- Industry was able to reduce crop losses due to these pests while also reducing chemical usage on-farm (FeanaMiphos usage has halved in QLD; Chlorpyrifos soil incorporated prior to planting has reduced by 12% in Bundaberg; Phorate usage has decreased by 75% in Bundaberg).

Current ASPG led sweetpotato projects

- HAL project VG09009 (2010) – varietal improvement
- HAL project VG09052 (2010) – integration of crop and soil insect management in sweet potato

Source: Australian Sweetpotato Growers Association (ASPG Inc.)

### 7.2.2 Marketing

There is no marketing levy collected for the vegetable industry, though it has been a topic of ongoing debate. Levy payer meetings, as part of this consultation, demonstrated pockets of support for a marketing levy.

The extent to which a marketing levy will, for example, contribute to the desired outcomes of the industry as identified in this report (e.g. consumer alignment and non-farm development) is difficult to determine. Research indicates that the degree of success of marketing levies depends on how the size of the levy and how the funds are managed.

Currently there are 21 horticulture sectors under HAL that collect \$14 million in levies to support marketing and promotion of their crops. With varying levels of funding as well as various strategic plans for marketing, there are many examples of successful and unsuccessful marketing levies. However, verifying the success of marketing levies through quantitative evidence is difficult to do, as there are few mechanisms to directly track consumer demand to marketing expenditure. Furthermore, there is limited production data by horticulture sector to make accurate comparisons over time of marketing levied and non-levied products.

Avocado and Macadamia are good examples of what large budgets (\$1.8m and \$1.6m, respectively) can accomplish in terms of large-scale marketing campaigns. “Add an Avo”, “Nuts for Life” and Banana’s “Make Your Body Sing” are campaigns that have been able to reach a large target audience. In addition, funds can be used for investing in sponsorships and partnership agreements to raise awareness (e.g. Macadamia’s “I Heart Footy”).



Summerfruit is an example of a sector with a limited amount of marketing funding; focusing mostly on public relations spending.

In respect of mushrooms; which are levied separately from vegetables, the R&D and Marketing & Promotion programs are funded by a compulsory levy on mushroom growers of \$2.16 per kilogram of spawn purchased. 25% of the funds collected are allocated to research & development and 75% to marketing & promotions. The Australian Mushroom Growers have developed a vision for the future and put a strategic plan in place to guide the industry towards reaching its vision by 2011. The overriding goal is to create an environment that allows growers to maximise the return on their mushroom industry investments. The strategic plan sets out how the industry aims to achieve this by:

- developing an environment where there is a strong demand for mushrooms;
- providing information to increase efficiencies on farm; and
- minimising risks to the industry.

Marketing in general for individual products has proven to have successful outcomes where applied in a focused way and where there are significant budgets and resources directed at the program (e.g. golden kiwi fruit). However, in the vegetable industry with a diverse range of products and difficulty in creating a focused and clear campaign, the outcomes are less predictable.

Research related to developing and implementing a marketing strategy has been performed through at least two projects since the adoption of VegVision 2020 (VG08077 - Implementation of the vegetable domestic marketing development strategy and VG07189 - Project for developing a marketing plan for the Australian vegetable industry). These projects were aimed at implementing a marketing strategy using R&D levy money and other available sources of funding. The outcomes of these projects were unresolved with Phase II of this work terminated because it was determined to be outside the scope of the R&D levy.

It is also important that the industry going forward produces products in ways that more closely align to consumer demands. Consumers need to be made aware of these benefits and innovations. Additionally, modelling the benefits of increasing consumer demand (refer section 9) reveals that any successfully strategy will have the greatest positive impact on the industry, particularly given the offsetting price reductions associated with productivity increases.

In addition to the question of whether an industry as diverse as vegetables can benefit enough from marketing campaigns, the topic of a marketing levy conjures up

numerous additional areas for discussion and debate. Some of these questions are:

- What degree of funding is needed to develop a successful marketing campaign for vegetables?
- What is the best marketing mix to achieve returns for vegetables?
- Is a levy the best way to fund vegetable marketing (see appendix A for 12 Mandatory Principles for Instituting a Levy). If not, can marketing be done through other means of funding (e.g. grants or VC)?
- Can marketing be done in a way that it promotes domestic vegetables without benefiting un-levied vegetables and imports?
- Should marketing be regional-based, commodity-based, or a broad campaign of vegetables across the country?
- How can a message be consistent and effective across all vegetable products and regions?
- Should marketing be used to extend vegetables into export markets?

There are examples of using alternative funding to finance current marketing campaigns, like the “Go for 2 & 5” campaign; which was partly funded by the Department of Health and Ageing and was considered successful by at least some sources (see box below).

**Increasing fruit and vegetable consumption: success of the Western Australian Go for 2&5 campaign**

The multi-strategy fruit and vegetable social marketing campaign, conducted from 2002 to 2005, included mass media advertising (television, radio, press and point-of-sale), public relations events, publications, a website ([www.gofor2and5.com](http://www.gofor2and5.com)), and school and community activities.

Campaign development and the evaluation framework were designed using health promotion theory, and assessed values, beliefs, knowledge and behaviour. Two independent telephone surveys evaluated the campaign: the Campaign Tracking Survey interviewed 5032 adults monitoring fruit and vegetable attitudes, beliefs and consumption prior to, during and 12 months after the campaign; and the Health & Wellbeing Surveillance System surveyed 17,993 adults between 2001 and 2006, continuously monitoring consumption.

The campaign reached the target audience, increasing awareness of the recommended servings of fruit and vegetables. There was a population net increase of 0.8 in the mean number of servings of fruit and vegetables per day over three years (0.2 for fruit (1.6 in 2002 to 1.8 in 2005) and 0.6 for vegetables (2.6 in 2002 to 3.2 in 2005), significant at  $P <$



0.05).

Source: Pollard CM; Public Health Nutrition, 2008 Mar; 11(3):314-20. Epub 2007 Jul 6.

The question of a marketing levy is unresolved until research is dedicated to understanding the potential benefits and whether a successful campaign can be developed and funded. The risk of failure (or under performance) is high given the diversity of products and the limited resources and focus that would be available for a marketing campaign. However, it is clear that marketing, if executed well, could potentially contribute to key growth areas for the industry as identified in this report (e.g. Consumer Alignment and Non-farm Development); echoing the sentiment of VegVision 2020. Therefore, there may be a case to use R&D funds to investigate the potential for a marketing levy or investigate potential other programs that could fund marketing in the absence of a levy. The investigation into other programs would consider for example, if marketing is better done regionally, by commodity, or the more efficient 'industry-as-a-whole' approach.

**Recommendation 3: Given the barriers to establishing a marketing levy, the range of activities to be implemented as part of the SIP, alternative funding for marketing investment potentially available, and the significance of other structural reforms outlined in this SIP, it is recommended that a marketing levy should not be pursued over the next 3 to 5 years.**

**Recommendation 4: Any consideration of a marketing levy should be supported by a full business case.**

### 7.2.3 Opportunities to Export

The competition for market access both domestically and internationally was a commonly discussed topic throughout our investigations.

Exports offer the greatest opportunities for Australia's fresh produce vegetable industry as the scope for growth is virtually unbounded and other countries have achieved annual growth rates of 10% per year. The impact modelling (below in section 9) demonstrates that the gains from increases in exports offer the greatest potential payoffs from R&D, but that the relative effects on margins is not as high because of the relative insignificance of the current export market.

Australian exporters need to improve their value proposition in existing export markets if they are to stem their decline in their market share domestically, and access global markets which are currently growing and will offer unbounded opportunities for margins.



There are a number of countries that are succeeding in export industries through a strategic and co-ordinated approach to exporting. Examples of the Netherlands and New Zealand are discussed further in the box below. Spain, the Netherlands, China and Mexico are the World's largest net exporters of vegetables. Together they account for 64% of worldwide net vegetable exports, as measured in US dollars' worth of vegetables<sup>39</sup>. Due to an abundance of suitable land and cheap labour, Eastern Asia is the world's largest net exporter of vegetables; meaning Australia's exports in region are facing heavier than average competition.

#### **Netherlands**

Despite being only the 28<sup>th</sup> largest vegetable producing country, the Netherlands is the world's leading net vegetable exporter by value. The Netherlands is the world's largest producer of onions to more than 60 countries the world over, while Dutch tomato exports are only surpassed by Mexico. Protective greenhouses are predominantly used in this region and growers are subsidised for using clean energy. These factors, along with the trend of growers and sales businesses forming growers associations and marketing organisations, has helped to lead to this success. These cooperatives enable more efficient packing, handling and marketing of a variety of vegetables.<sup>40</sup>

#### **New Zealand**

According to ABARE statistic, around 47% of New Zealand's horticulture was exported in 2009. The New Zealand vegetable industry has consolidated in recent years with a reduction in the number of market gardeners and the development of large diverse commercial vegetable growing businesses. In many regions farms grow a range of vegetable, arable and forage crops, and graze livestock. This mixed farming system facilitates crop rotations and helps to manage business risk.

Vegetable exports including fresh vegetables and processed vegetables go to roughly 75 countries. Onions and squash/Kabocha are the main fresh vegetable exports. Japan is the major market for fresh vegetable exports, while Australia is the main market for processed vegetables. Frozen peas, sweet corn, mixed vegetables and potatoes and carrot juice and tomato paste and purees are the main processed vegetable products.

New Zealand innovates with a continuing stream of new varieties that anticipate and meet the changing needs of consumers. As well as fresh produce, New Zealand is a major exporter of processed fruit and vegetables. Leading technology such as snap-freezing vegetables to protect them from nutrient loss and to retain flavour, gives this sector a competitive advantage.<sup>41</sup>

<sup>39</sup> The Spanish Federation of Associations of Producers and Exporters of Fruits, Vegetables, Flowers and Live Plants, FEPEX

<sup>40</sup> 'New research puts fruit and vegetable trade on the map'; Eurofruit Magazine – June 2006/No. 386

<sup>41</sup> Fruit and vegetable industry in New Zealand (January 2007); New Zealand Trade and Enterprise



A common theme among all leading vegetables exporters is the ability to provide high quality products to “off-season” regions. This is common for places like Spain and Mexico; which provide tomatoes nearly year-round to countries that do not have a suitable climate. This seasonal market timing is apparent in imports to Australia; which are sourced by large grocery retailers from regions in opposite climates (e.g. lettuce imported from California during off-season months).

Various areas of research could be undertaken to develop better approaches to exports markets for the industry, for example:

- success factors and impediments to exporting (including examining successful case-studies of countries that are succeeding in their export capabilities – including achieving scale and consolidation in areas of export potential);
- the opportunities for growth in various markets, including China as the demand in developing economies in our region grows;
- technologies that extend shelf life, while protecting products from nutrient and flavour loss (e.g. irradiation has a bad reputation with consumers);
- co-operatives seem to have been successful in achieving some success in exports for certain nations. The potential for co-operatives and the use of the R&D levy for this is discussed in section 7.4 below;
- strategies to link into international networks; and
- priority export markets and crops within these markets.

### 7.3 Market & Value Chain Development

This area relates to the development of value adding processes and both domestic and international supply chains. The ability for levy payers to be competitive in the vegetable market depends on a range of issues such as access to vegetable markets, and export and import competition. Vegetable markets need to expand to grow the value of the industry and developed properly to capture a larger portion of this value for growers.

#### 7.3.1 Supply chain

The vegetable industry loses half a billion dollars per year in product wasted throughout the supply chain, which represents about 15% of the yearly national gross value from vegetable production<sup>42</sup>. R&D investments to improve quality and supply-chain could significantly contribute to the profitability of the industry.

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<sup>42</sup> Dr Silvia Estrada-Flores, *Opportunities and challenges faced with emerging technologies in the Australian vegetable industry (Technology Platform 3: Food Safety and Quality Assurance)*, Project VG08087, completed January 2010, p. 4



As discussed in section 4.3 above, the value chain for leviable vegetables demonstrates that transport, packaging, handling, wholesaling and retailing costs are very important as a percentage of farm-gate prices. There are currently large dynamic changes taking place in respect of the market segments to which the growers supply which needs to be understood and opportunities taken. The impact modelling in section 9 demonstrates that the biggest impact on farm incomes comes from changes in transport, packaging and handling margins.

Accordingly programs can be conducted in various areas to improve margins and to better access those supply-chains. Farming systems can be improved to obtain better use of supply chains.

- emerging technologies for management of supply, demand and inventories, which included enterprise resource planning, geospatial information and global positioning systems, remote sensing, electronic commerce, digital pricing and RFID track & trace;
- emerging packaging technologies, including active and intelligent packaging;
- cold chain logistics, including thermal packaging, mini-containers and refrigerated transport systems (sea, road and air); and
- emerging concepts in supply chain management, including emerging distribution models (e.g. local supply chains, sharing of distribution networks and infrastructure, and supermarket initiatives in sustainable distribution) and horticultural value chains.

However, the fact that a low percentage of horticultural farms are using a computer (62% in 2006)<sup>43</sup> is a major impediment to achieving supply chain excellence; such emerging technologies require the use of computers and related knowledge. Additionally, in terms of R&D into emerging technologies (such as quality technologies outlined above) there is a long lead time (e.g. ten years) to get outcomes from this type of research, and it can require high amounts of capital investment to be undertaken.

### 7.3.2 Competitive analysis

The threat of imports was a key theme raised by most levy payers. Imports have risen steadily over the past decade, increasing 48% between 2005/06 and 2009/10. Of particular concern to many vegetable growers was the lack of understanding by domestic consumers about:

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<sup>43</sup> Dr Silvia Estrada-Flores, *Opportunities and challenges faced with emerging technologies in the Australian vegetable industry (Technology Platform 1: Supply chain and logistics)*, Project VG08087, completed June 2009, p. 3



- **Packaged and processed food origins** – as the labelling laws do not specify the percentages of Australian and imported vegetables to be provided on the packages.
- **Nutritional value** – With perceptions that imported products often do not have the same nutritional value as Australian grown products.
- **Growing practices and accreditation** – Imported products are often from developing economies that are perceived to not have to comply with the same quality assurance and growing practices as in Australia.

It is our understanding that work is being done at a political level to design more transparent labelling requirements for packaged vegetable products. These efforts may be supported for example by assistance from the R&D levy in areas such as:

- the behavioural impacts of food labelling on consumer behavioural patterns;
- testing the design of various labelling techniques on consumer behaviour;
- nutritional value of certain growing practices or crop types;
- market analysis about the true extent to which there is a problem of labelling and its impact on the Australian vegetable industry; and
- independently testing imports for residue of banned chemicals.

Additional key issues raised by levy payers, included markets and competition related issues such as:

- The lack of standardised quality assurance programs throughout the domestic industry. There are avenues that are less regulated such as farmers markets and local markets, where some growers are able to sell products that may have unacceptable levels of residues or be packaged in 'second-hand' packaging. This was considered problematic because this inferior product could undermine the reputation and brand of Australian produce generally and also potentially devalue the existing efforts to develop value-added and differentiated product in the domestic and international markets.
- The lack of clear and standardised Occupational Health and Safety (OHS) standards for the vegetable industry. For example, the weights and measures of packaged and boxed products are unclear and not standardised. This makes it difficult for growers to ensure they are meeting the requirements of the OHS laws whilst also being able to manage the demands of retailers that also develop their own specifications for measurements and weights.
- There is a perception that imported products from many third world countries

including India and China have a competitive advantage not just due to a lower cost structures but as a result of a less regulated labour market and less stringent environmental practices. There were a number of reports by growers that some chemicals banned in Australia for health and safety reasons were used in other regions and were contained in imported crops. This perception although not supported by wholesalers or retailers could justify further investigation.

Whilst these regulatory issues affect the nature of the market and whether competition is efficient and effective may be an appropriate R&D project, any such projects would need to meet the same criteria as other R&D projects.

Farmer registration is one means used around the world to enforce food standards and track infestations back to the source as a means of biosecurity defence. Countries around the World with registration schemes include the US, Thailand and Jamaica.

Secondary benefits to farmer registration include barriers to entry as well as a means for data collection to be used in monitoring industry progress and assisting in R&D projects. From mandatory registration, the industry could achieve a database of growers to be used for a variety of benefits to industry bodies, growers and other members of the supply chain.

Such accreditation, if designed properly could have the additional effects of:

- increasing the Australian/vegetable grower “branding” ability – by demonstrating that certain quality and process requirements have been met; enabling the substantiation of various credence claims that have been made for differentiation purposes and by controlling against fraud or unfair competition;
- improving the traceability of produce (including organic certification);
- ensuring that consumers are aware of origins and quality of produce; and
- enabling farmers to do small pieces of documentation work during the year, but having reduced compliance processes during certification or inspection times.

Additionally, a scheme might be accompanied with policy aimed at increasing the cost of distributing unsafe foods, such as fines or plant closures, or policies that increase the probability of catching unsafe producers, such as increased safety testing or food borne illness surveillance.

Where the goals of better regulatory and market outcomes cannot be achieved by levy funded projects (for example, because they involve agri-political issues), then it is the PIB’s role to take on these issues as a means of achieving the vision outlined in the Strategic Plan.

## 7.4 Business Management

This area involves developing innovative techniques and technologies to improve on-farm production efficiencies. The ability for vegetable growers to get better at what they do is crucial for being profitable domestically and internationally, as well as for competing with imported products

### 7.4.1 Traditional areas of productivity innovation

Areas identified where innovation could be targeted are improved yields, labour saving devices, disease control, precision horticulture and quality. However, demand for particular vegetables are sensitive to price, and price changes. Large increases in price can constrain demand and encourage consumption of alternative foods. Additionally, demand for some vegetable products can result in substitution for others. As modelled in section 9 below, the impact on total factor productivity improvements on grower's margins is low compared to the impacts of other variables because there is only a small export market which will not absorb the increased output.

Accordingly, increased productivity in terms of yield can have greater benefits where there is an accompanying growth in demand for the industry overall. Accordingly, as seen from the aforementioned sweet potato example, productivity developments when accompanied by a consumer demand strategy can yield great benefits for growth and profitability.

### 7.4.2 Review of the potential for co-operatives

The vast majority of vegetable operations are small to medium family owned businesses; 80% of farms producing less than \$350 thousand in farm gate value and over half producing vegetables on an area of 9 hectares or less.<sup>44</sup> These smaller operations face particular difficulties in terms of achieving scale, accessing capital, setting prices, complying with retail specifications, accessing skills and resources to focus on the management and strategic direction of their farms, and providing consistence supply.

In 2008-2009, the average rate of return to capital for vegetable farms sowing less than 5 hectares of vegetables was -1.1%, compared with an average of 10.3% for those sowing more than 7- hectares of vegetables; with a similar relationship found in 2007-2008.<sup>45</sup> Anecdotal evidence suggests that the formation of cooperatives has

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<sup>44</sup> Source: Sarah Crooks, 'Australian vegetable growing farms: an economic survey, 2008-09, ABARE-BRS research report 10.12, November 2010, p. 5

<sup>45</sup> Source: Sarah Crooks, 'Australian vegetable growing farms: an economic survey, 2008-09, ABARE-BRS research report 10.12, November 2010, p. 21



been suggested as a potential solution to many of the impediments small growers face. An example of a project that examined the potential for using co-operatives to access finance was VC Project No. HG05041 and HG07096.

During the development of the SIP, the recommendations of these projects were shown to continue to be relevant, particularly where:

- growers who are nearing retirement age and are looking for an exit strategy for the operation of their farm, at least in part;
- growers for a given crop are tightly clustered in a region;
- growers have co-operated in the past and already have strong ties;
- there are strategic thinkers and leaders in the group who are capable of organising and driving the process and willing to provide significant time to the process;
- the groups sets up a cohesive governance structure and allocates roles and responsibilities for achieving particular goals;
- there are regular meetings, feedback and communication channels within the co-operative; and
- where participants have a collaborative rather than competitive view of each other's operations.

**Recommendation 5: A pilot cooperative model should be trialled with the learnings used as a model for further extension into other regions of Australia that meet the aforementioned criteria for cooperative development.**

Naturally, any levy funding used to progress more formally the cooperative initiative would have to meet and be competitive against other levy funded projects.

#### **Project HG07096**

The project was conducted by a consulting team from HLB Mann Judd Consulting. The study was informed by interviews with SME producers and a range of funding institutions across Australia including trading banks, investment banks, superannuation funds and independent horticultural consultants.

This project follows on from VC Project No. HG05041 Analysis of funding sources for horticultural ventures and development of appropriate funding models for SME producers.

Two recommendations from this earlier project were to:

- Provide focused training for producers to develop better quality business cases and funding applications.
- Facilitate development of the new cluster funding model identified in the project as the best option to fund new horticultural projects for SME producers, typically under \$10 million.

The aim of this project (HG07096) is to support implementation of the earlier recommendations via a structured piloting process.

## **7.5 In-field productivity & resource use**

This area involves the ability for growers to defend themselves against threats involving the inputs needed for production on the farm. This includes threats like the rising costs of inputs, the effects of variable climates, water and soil shortages, and emerging pests and disease.

### **7.5.1 Dealing with climate change**

Biofuels, glasshouse technologies, smart demand management in cold chain operations, water generation technologies and smart irrigation are technologies which may have potentially significant benefit.

Current pressures to mitigate and adapt to climate change and the quantum of savings on some of these areas may call for investment on early-stage technologies to shorten the research and development cycle. This may become an even greater hurdle if other larger emitters in horticultural supply chains (e.g. packaging, transport, retail) transfer the costs of mitigation and adaptation to growers instead of passing these costs to consumers.

In preparation for possible future support for the introduction of genetically modified crops as an adaptation strategy, assessments on the environmental effects of transgenic plants and their benefits in improving yields, aiding soil and water conservation and increasing the resilience of Australian vegetable chains could be undertaken.

### **7.5.2 Overcoming challenges with resources/inputs use**



### a) Labour

Labour shortages (due in part to the mining boom) and workplace regulations, means that the labour costs represent a very high percentage of a grower's cash input costs at roughly 80%.<sup>46</sup>

### b) Chemicals

Minor use

The Australian Pesticides & Veterinary Medicine Authority (APVMA) issues permits for emergency uses (minor crops, or minor uses in major crops) and for research purposes. The Pesticide Minor-Use Co-ordinator (PMUC), Peter dal Santo, manages the steps in this process of minor use permit applications, under a yearly funding program using HAL sponsorship including the vegetable R&D levy.

There is a proliferation of small crops in the vegetable industry, which suggests that assistance for acquiring permits for use of these chemicals for these small crops is important for the vegetable growers of these crops.

Minor use permits have for example been used for western flower thrips (WFT) control in bulb vegetables, cucumber, eggplant, herbs, leafy vegetables, peas, peppers, root vegetables, tomatoes, ornamentals, strawberries & stone fruit. Prior to 2004, there were no insecticides registered for the control of WFT. Many products were registered for thrips control, but many were ineffective due to resistance. The whole pesticide strategy for WFT control was based on industry generating the necessary data to support management/control via minor-use permits for WFT. Without permits, effective control of WFT in Aust horticulture would not be possible.

Lettuce aphid (LA) control in lettuce. LA was first identified as a pest of NZ lettuce in 2001. The vegetable industry funded trial with imidacloprid (Confidor) as a control measure, in case the pest ever arrived in Australia (2002 and completed in 2004). LA was first identified in Tasmania in January 2004. As the vegetable industry had the necessary data, an emergence minor-use permit was prepared and issued 2 days (which appears to have prevented the collapse of the Tasmanian lettuce industry). The permit was then issued for all states as the pest arrived. The protocols for LA control in lettuce with imidacloprid are still in place today. Without the permit, 30-60% of all lettuce heads would need to be discarded.

Pesticides for brassica leafy vegetables. With the expansion of BLV crops

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<sup>46</sup> Source: Sarah Crooks, 'Australian vegetable growing farms: an economic survey, 2008-09, ABARE-BRS research report 10.12, November 2010, p. 13



throughout Australia in early 2000's, very few pesticides were registered to address the range of plant pests encountered. This led to some illegal use and residue non-compliance. The vegetable industry invested significantly in 2003-2005 in generating the necessary data to support minor use permits for BLV. This has led to 16 minor-use permit with 10 others in progress.

A national dedicated co-ordination program for minor use appears to have been beneficial as this consolidates effort and spreads the costs across crops and makes it possible to issue permits in crops where there would not be a market justification. The co-ordinator also works with manufacturers to obtain their data, where possible, for minor use permits.

The co-ordinator also determines, prior to moving ahead with a project, whether the chemical companies are willing to fund the registration of the permits themselves. This ensures that minor use permits fill the void where the market is unwilling to participate. It is however questionable whether chemical companies would in some cases fund directly registrations if the minor use program was not available.

The minor use program is also co-ordinated with IPM (discussed below), with the aim of having a range of IPM compatible pesticides which are also acceptable to the market place and have the potential to be available to the vegetable industry for a long time.

### **c) Plant health**

There is a pressing need to research low cost alternatives to replace organophosphates and other chemical pesticides. New biotech efforts for crop production are essential (as chemical-based technologies for crop protection slows down).

#### **Integrated Pest Management (IPM)**

Integrated Pest Management (IPM) is a farm management strategy to keep the population of harmful pests below the point where they are causing unacceptable loss in marketable yield. IPM management strategies use a range of complementary tools and control techniques.

IPM considers the production system as a whole by looking at all management aspects as potentially impacting on pest populations, and where possible manipulating those components to reduce their numbers. IPM involves most areas of crop protection, including:

- all forms of pests (weeds, diseases, invertebrates, vertebrates, etc.);



- all forms of prevention (biosecurity, hygiene, breeding resistant varieties, etc.);
- all forms of cure (incursion management, beneficials, chemicals, etc.); and
- all elements of the supply chain (from inputs to production to consumers).

Plant health has constituted over 50% of RD&E investment by industry from 2001-2010 IPM management has been undertaken at a national level during a one year pilot program under the VIDP program (see section 12 for discussion of the National Vegetable Integrated Pest Management Coordination project VG09191). The management of IPM is currently being reviewed. The VG09191 project has almost completed an audit tool for selected major crops which includes a database of 200 extension resources, to be used by growers to determine the available IPM resources for their crops.

There is an anecdotal view that the IPM program is important and has important impacts for the industry. For example, IPM offers an alternative avenue of pest management to pure chemicals usage.

The IPM program is now part of the VIDP program which is discussed in section 12.

#### **d) Soilless production/protected cropping**

Environmental challenges and increasing food scarcity means that soilless culture becomes useful where there is a lack of fertile soils and water scarcity. Key areas for soilless production are greenhouse production of vegetables. Australia has been relatively slow to embrace this capability with for example the UK producing 4 times more vegetables under protected cropping practices than Australia.<sup>47</sup> Australia could better utilise protected horticulture; however, greenhouses (especially with active heating and cooling) are more capital intensive than field cropping with most farmers unable to support such investment.

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<sup>47</sup> Dr Silvia Estrada-Flores, *Opportunities and challenges faced with emerging technologies in the Australian vegetable industry (Technology Platform 5: Production and Harvest)*, Project VG08087, completed 30 June 2010, p. 43 & 5



## **7.6 Industry Development Drive Train**

There are a number of enduring capabilities that need to be sustained by the vegetable industry to both maximise the benefits of levy funded projects and to cover capability areas that are not research and development projects. Specifically the vegetable industry requires ongoing capabilities in the areas of communications, knowledge management and industry analysis. Currently these capabilities are delivered through the VIDP program. The VIDP and its relationship to the Drive Train have been reviewed as part of the development of the Strategic Plan and SIP.

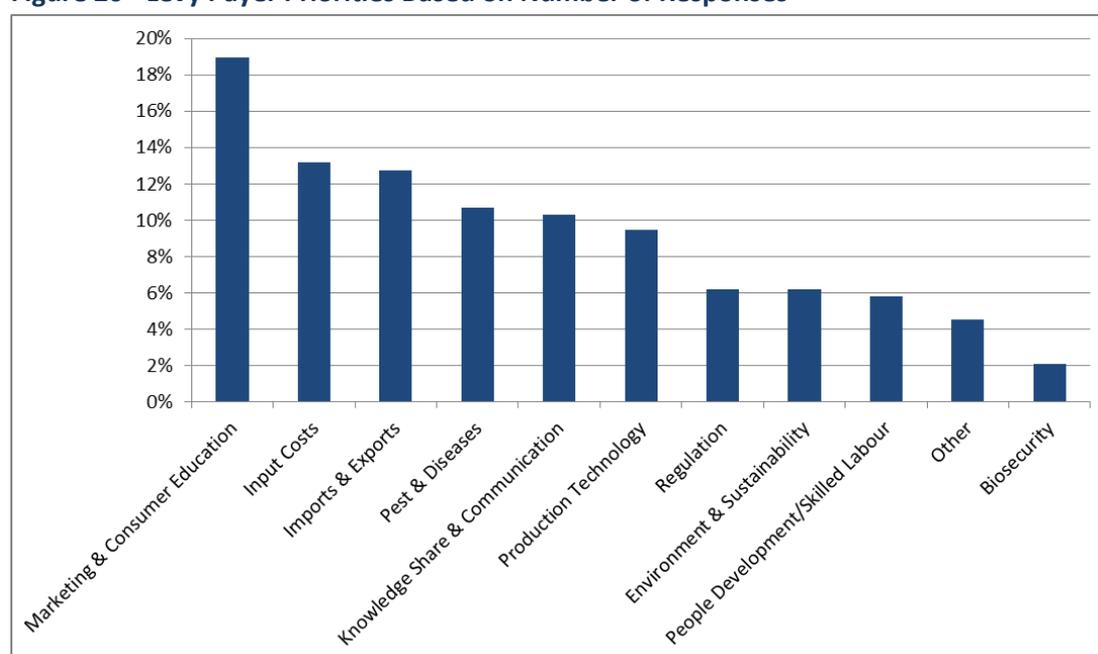
Sections 11 and 12 contain some of the key issues raised with respect to governance, development and extension, which affect the ability for the Drive Train to deliver the Strategic Plan and SIP outcomes. Accordingly, the vegetable industry should further consider the issues raised in those sections in order to determine whether those areas can be aligned to the Strategic Plan and SIP.

## 8. How has the R&D levy been invested and monitored?

### 8.1 Levy payers – desired spend

Five separate focus groups of levy payers were carried-out in various growing regions around the country in early 2011. During these meetings, members were given an opportunity to nominate the most crucial topics of investment needed to improve the industry. These results were categorised appropriately and arranged into the resulting Figure 20. The results revealed that growers' concerns are spread across several key issues; with categories that are not significantly different from priorities set in previous industry reports and surveys. It is noteworthy that marketing and promotion (including consumer research and education) was a stand-out category at near 20% of total levy payer responses. While increased costs, the threat of imported products, plant health, communication, and new technologies in production capabilities were also common themes among respondents.

**Figure 20 - Levy Payer Priorities Based on Number of Responses**



ABARE conducted a similar study in 2008- 09 of 278 growers. Although research priority issues were categorised differently they overlap significantly with levy payer workshops findings noted above. In response to high or very high research and development priorities the ABARE survey found 85% of respondents nominated Pests & Diseases, followed by Higher Yielding Varieties at 76% of respondents, Farm Productivity reported by 74% of respondents,

Environmental Sustainability reported by 53% of respondents, Marketing and Market Development reported by 42% of respondents, Consumer Research 35% of respondents, and Chilling/Storage Technology reported by 29% of respondents. All of these categories were acknowledged by at least 90% of ABARE respondents as having some weight as an industry priority.

The short list of top priorities were similar in both surveys (i.e. Consumers/Marketing, Plant Health, Technologies, Productivity, etc.), although the weights between those top priorities differed significantly. This can be expected as survey results are influenced by numerous factors, including, the nature of sample respondents and the structure of the question. The variation between these two surveys is most likely due to the structure of the question asked as well as the varied demographics between the two representative samples. The ABARE survey was conducted on farms and asked specifically for Research and Development Priorities; which have historically been tied to efforts in researching productivity and plant health. Their methodology also appears to nominate in advance pre-determined issues which are then asked to be weighted, whereas levy payer workshops allowed growers to self-nominate priority areas which were then categorised collectively with levy payer agreement. In addition organised levy payer meetings are concentrated in key growing regions and do not have the same geographic coverage as the ABARE survey.

## **8.2 R&D levy – actual spend**

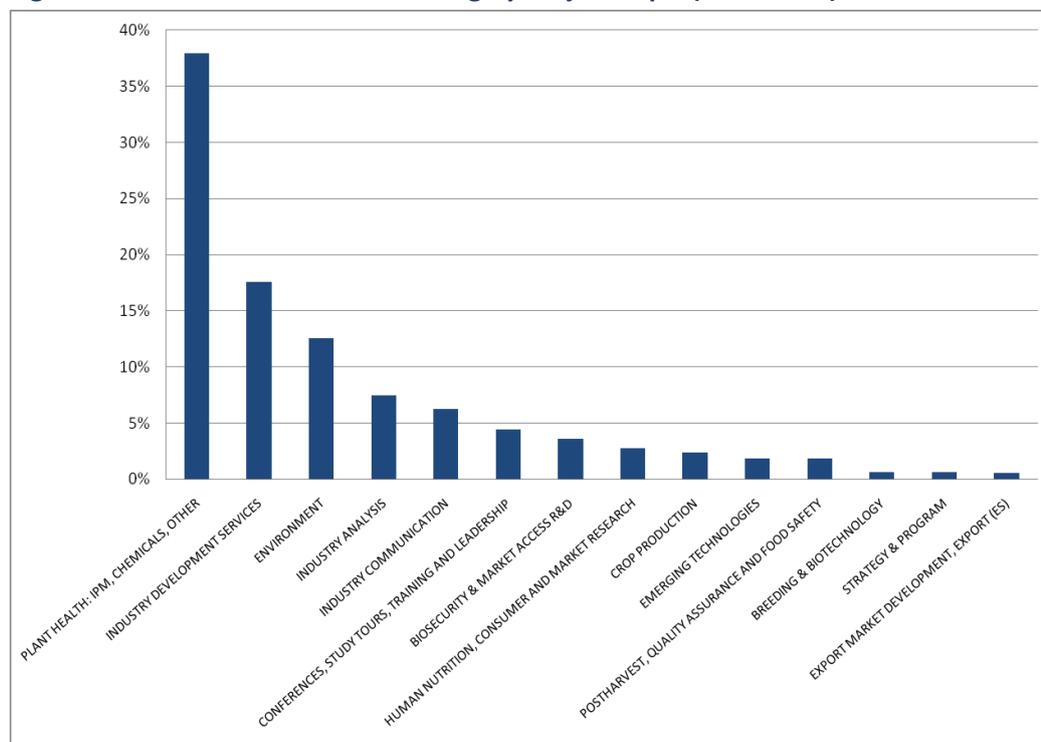
With matching Australian government funding, the vegetable industry has the capacity to fund an annual R&D investment program of around \$13 million per annum.

### **8.2.1 Historical spend**

Since 2006, roughly \$65 million has been allocated to R&D projects for the vegetable industry. Of this investment, nearly 40% has been designated for plant health related activities (including integrated pest management, pathology, and chemicals). Other significant investment areas since 2006 are Industry Development (17%), Environment (13%), and Industry Analysis (7%). These are significant investments when compared to the 3% spent on Marketing and Promotion; which was the top priority in the results of our levy payer poll.

Figure 21 represents the historical project portfolio, allocated across the 14 HAL portfolio categories for the vegetable industry.

**Figure 21 - Allocation of RD&E Funding by Project Topic (2006-2011)**



### 8.2.2 R&D providers

Over this period, the number of projects approved for funding was weighted heavily toward government entities (33%), with roughly 30% to commercial organisations, and the remaining projects naming a university or industry body as the project lead. The most significant entity in both the number of projects and percentage of funding received was AUSVEG; who was granted roughly 14% of all projects and allocated 16% of all R&D funding. Since 2006, HAL managed 14% of funds<sup>48</sup>, the Victorian Department of Primary Industries (VICDPI) was granted just over 9%, the New South Wales Department of Industry and Investment was allocated 8%, and the Department of Employment, Economic Development and Innovation was granted roughly 6% of R&D project funds.

Many of the leading research providers classified by Excellence in Research for Australia (ERA) rating, reputation and publication track record did not feature strongly as R&D providers to the vegetable industry. A number of consistent themes were given to explain their lack of engagement in the vegetable industry which included the

<sup>48</sup> Note that HAL is not a service provider to the vegetable industry. HAL funding reflects projects awarded to third party providers but administered through HAL.

small dollar value of projects, a lack of continuity in funding, confusion/communication over projects that do and do not get funding, long lead times to commence work, disproportionate effort required for funding approval and an increasingly difficult environment to have projects funded.

### 8.2.3 Allocated spend going forward

The current project portfolio for R&D spending in the vegetable industry consists of nearly 200 projects with a commitment of \$57 million in funding over the life of these projects. This means that a typical R&D project is allocated on average \$285 thousand; a relatively small amount for research projects that need to be introduced to and adopted by growers to achieve results for the industry. Analysis of this portfolio reveals a continued focus on plant health related topics.

## 8.3 How does this align with VegVision 2020 goals and priorities?

VegVision 2020 was the vegetables industry's overarching strategic plan launched in 2006 to guide the industry over the following 15 years. The overarching goal was to *"double the 2006 value of fresh, processed and packaged vegetables in real terms by stimulating and meeting consumer preference for Australian products in domestic and global markets."*

The five strategic imperatives of the VegVision plan were:

- delivering to changing consumer preferences and increasing demand;
- market recognition for Australian quality, safety, reliable supply and innovation in products and services;
- internationally competitive Australian vegetable supply chains;
- advanced industry data and information systems to meet future needs; and
- visionary leadership and change management.

The AVIDG were established to take stock and set directions for the Australian vegetable industry. Seven foundation themes were identified against which the AVIDG made decisions on the allocation of funding to specific projects to address those themes.

In June 2008, the Foundation Project Business Case for VegVision 2020 found that the Vegetable industry levy payers could expect highest investment returns if funding allocations across six VegVision 2020 priority areas were:

- between 20 and 56% for initiatives to **increase domestic demand**;
- between 0 and 19% for initiatives to **increase export demand**;
- between 15 and 24% for initiatives to **reduce labour costs**;



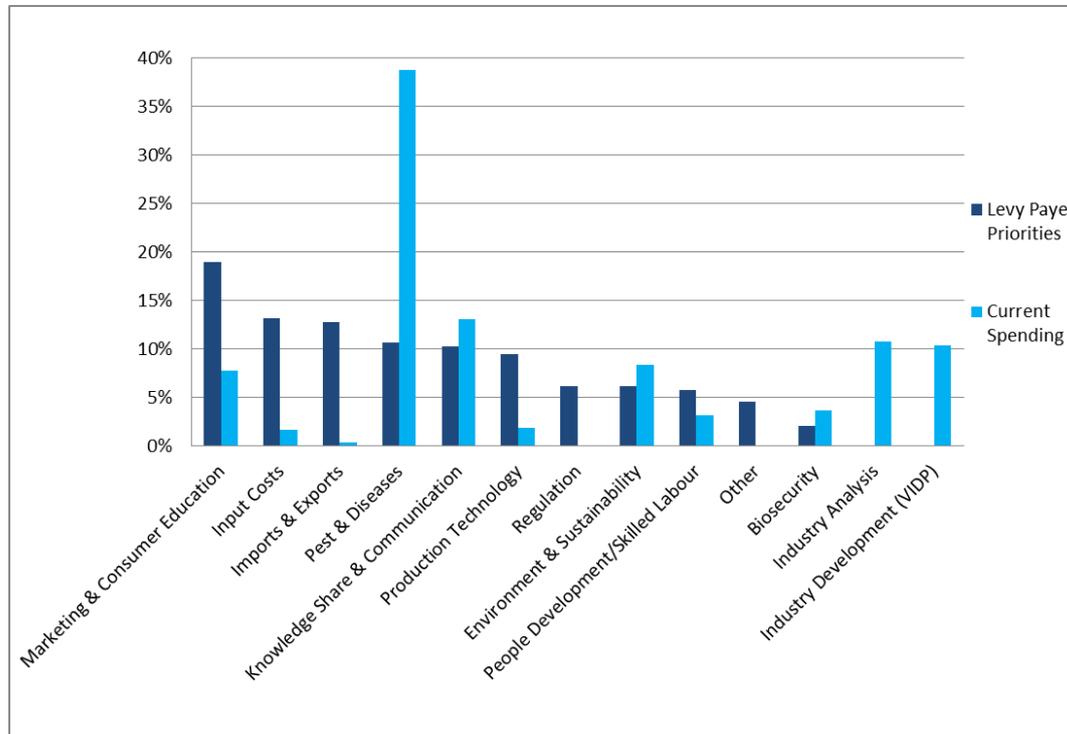
- between 9 and 20% for initiatives to **reduce chain costs**;
- between 6 and 19% for initiatives to **enhance industry leadership**; and
- at least 5% on initiatives to improve the **quality of information**.

Our analysis of current RD&E portfolio investment by industry topic reveals a significant misalignment between project spending and the recommendations set out by VegVision 2020. The results suggest that insignificant levy funds were invested directly towards increasing Domestic Demand (<5% of total investment), Increasing Export Demand (<1%), Reducing Labour Costs (<1%), and Reducing Supply Chain Costs (<1%). Conversely, investment in the areas of industry leadership and quality information has exceeded the VegVision 2020 business case standards (around 15% and 12% current spending, respectively).

#### 8.4 Levy payers desired spend compared to actual spend

Not only were levy funds not invested in alignment with the VegVision Business Case, they were not aligned to levy payer priorities as described in section 8.1. Figure 22 illustrates the misalignment between the levy payer priorities and the current focus of investment.

Figure 22 - Levy Payer Priorities vs. RD&E Portfolio Allocation



This analysis reveals a major misalignment between the levy payers' stated priorities and the actual investment of the levy payers' funds. Figure 22 also shows that a large portion of



funding is being spent on industry analysis, development, and communication. However, despite this heavy investment, levy payer respondents still voiced significant concern about the lack of deliverable results from research projects. This obvious misalignment between investment and perceived results may be a sign of:

- inadequate portion of investment designated for project implementation;
- communication investment may be ineffectively managed; and
- a general lack of tangible benefits to growers resulting from R&D projects.

The Strategic Plan and SIP is supposed to be the foundation for decision-making for the R&D funding. However, levy funds may be directed inappropriately, if an industry's plan is:

- flawed by way of content;
- is not supported by the broader industry including major levy payers; and/or
- does not prioritise R&D goals effectively (e.g. with clear objectives or proportional allocation of spending).

### **8.5 Conclusion on the R&D Levy spend**

As demonstrated Figures 21 and 22, the vegetable industry's R&D levy investment in the past - and allocated going forward - is heavily skewed toward production orientated projects; the large majority related to researching pests and diseases. This in part is reflected by:

1. the nature of projects proposed to the IAC; which tends to attract projects in the fields of IPM, Pathology, and Chemicals which currently account for nearly 40% of total funding;
2. the close relationships R&D providers from these fields have with the industry or the lack of relationship the industry has with non-production related providers;
3. the involvement in decision-making by mainly levy growers that might not have backgrounds or specific skills in relation to supply-chain and off-farm R&D issues;
4. levy payers perhaps not being aware of opportunities or developments in relation to off-farm issues and a general scepticism that the benefits of R&D in off-farm issues may not be fully realised by levy payers;
5. the composition of project advisory groups where there are more groups dealing with chemicals and pesticides and production oriented groups;
6. the 'open call' process for receiving potential projects, which encourages certain researchers to come forward with projects, instead of seeking projects that align to the grower priority areas;

7. a lack of clear guidelines about the requirements that the projects must meet – for example ‘end-user’ driven, impact modelling, demonstrated delivery of specific priorities in the strategic plan, implementation planning and performance reporting;
8. the fact that some researchers are deterred because the size of project investment is small and short-term with complex approval arrangements;
9. a lack of adherence to a specified proportion of investment funds being directed to particular strategic priority areas; and
10. a lack of requirements to transparently justify why spending may not be aligned to priority areas.

## 9. The Strategic Investment Plan (SIP) - how should the R&D levy be invested?

### 9.1 *Vegetable industry value chain*

The magnitude of the various components of the value chain for leviable vegetables (see Figure 5) are of interest in terms of where economic payoffs may arise from R&D investment along the value chain.

This analysis demonstrates that there are greater economic benefits for investment of R&D levy funds in certain components of the value chain.

### 9.2 *'Business-as-usual' baseline*

To be successful, the investment of the vegetable R&D levy in accordance with the Strategic Plan needs to beat the 'business-as-usual' baseline scenario forecast for the vegetable industry.

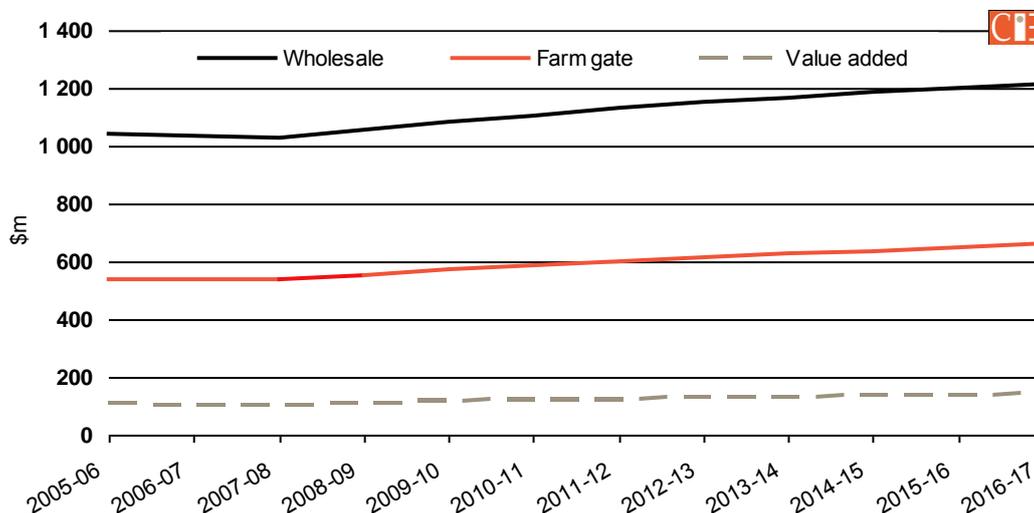
Figures 23 to 25 and Appendix B provides a detailed breakdown of a business-as-usual scenario of the leviable and non-leviable vegetables industries for the next six years by:

- production, exports, imports and consumption;
- prices, gross value of production and value added (profit); and
- use of hired labour and purchased inputs.

The baseline projections are derived using the CIE *Hi\_Link* model assuming rates of population, income, productivity, exports and imports growth over the period being modelled. The baseline projection is designed to indicate where the sector is headed if nothing else changes.

Currently, based on the CIE *Hi\_Link* model illustrated below, the gross value of farm production of leviable products is around \$1 billion at wholesale level, \$600 million at the farm gate and about 20% of that (\$121 million) is value added or profit to farms. In farm gate values, leviable vegetables make up about a quarter of the value of all vegetables. Both are expected to grow at about the same rate over the next six years.

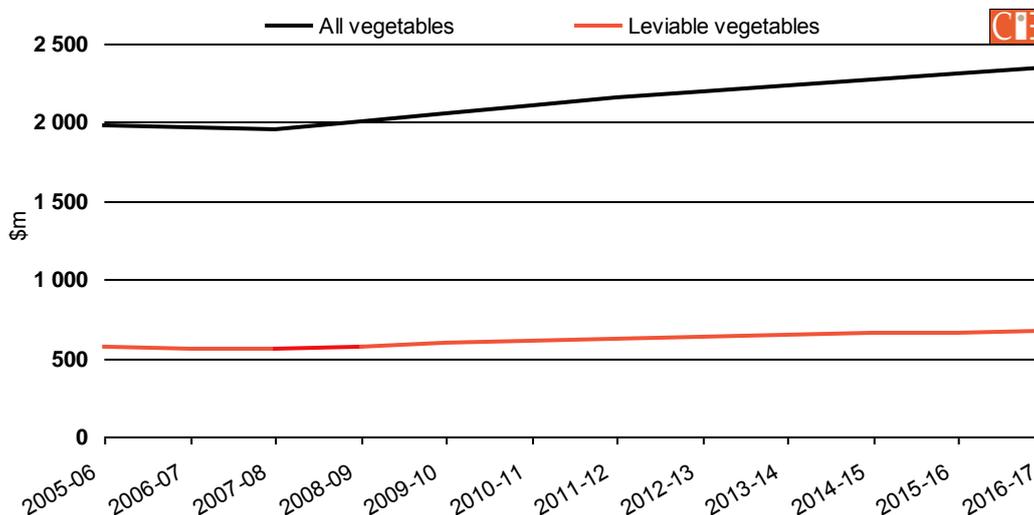
**Figure 23 - Value of production and value added at farm**



Source: Source: Hi\_Link model.

Australian consumption of leviable vegetables is currently nearly 1 million tonnes a year, with nearly 80% of this being household demand and nearly 20% being from the food services sector. In the next six years growth in consumption from the food service sector is expected to be at twice the rate as the growth in household demand.

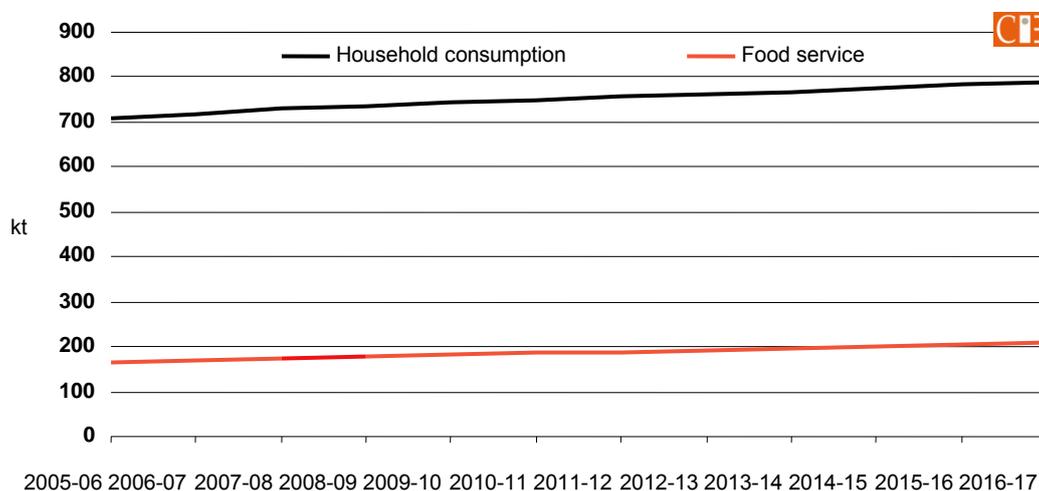
**Figure 24 - Farm value of production: leviable and non-leviable**



Source: Source: Hi\_Link model.



**Figure 25 - Consumption growth**



Source: Source: *Hi\_Link model.*

The projections set out in Figures 23 to 25 and contained in Appendix B indicate that the leviable vegetable sector would grow modestly under a business-as-usual scenario in response to continuing population growth coupled with modest productivity growth of around 1% a year. The scenario suggests:

- modest increases in production and consumption of around 1% a year;
- stronger growth in exports and imports at between 2 and 4% a year;
- food services consumption growth would be around 2% a year;
- slightly rising prices at farm gate, factory and wholesale prices;
- 2% annual growth in gross value of output and value added; and
- increasing costs of wages at around 3.5% a year.

Although growth in trade is more rapid than production and consumption, both are from a very low base. This reflects the fact that Australia is not highly competitive as an exporter, but that it also enjoys some natural protection from the world market due to high transport costs and possibly quarantine arrangements.

By 2016–17 gross value of farm production of leviable products is expect to increase by around 10% to around \$660 million and value added or profit is projected to expand to \$144 million by 2016–17 under a business as usual scenario, an increase of \$23 million.

The baseline establishes benchmark expectations of:

- a 6% increase in output by volume from the sector by 2016-17 (about 65 kt a year) to help satisfy rising demand and consumption caused by population and income growth;
- nearly a 12% increase in the value of production by 2016-17 (about \$71 million a year) due to slightly strengthening prices caused by population and income induced demand growth;
- nearly a 20% increase in profitability due to the combination of production growth, small price rises and cost controls either holding costs partly in check (some mild productivity growth) or being passed on to consumers due to buoyant consumption growth.

### 9.3 *Relative effects of changes from vegetable R&D levy investment*

Impact modelling has been conducted by CIE using its *Hi\_Link* Model of leviable vegetables, to demonstrate the relative impacts of investing R&D levy funding successfully into certain priority areas.

The key priority areas that have been modelled using the *Hi\_Link* Model are:

- transport, packing and handling margins;
- domestic demand;
- export demand; and
- total factor productivity.

The potential changes that might be possible following from the use of the R&D levy investment in those key areas are discussed in turn below. However, these estimates do not take account the likelihood of success, which has been considered in determining final priority category allocations.

#### 9.3.1 **Lower costs of getting product to market – increasing off-farm margins.**

Impact modelling suggests that by far the largest impact is indicated to arise from reducing off-farm costs. Partly, this is due to the fact that costs off-farm are larger than those on-farm. Decreases in such costs are therefore significant. Were they possible they would (due to competition) lower the price to consumers and induce increases in consumption relative to other foods. This would bid up farm gate prices and induce some increases in production. Both higher prices and increased production would increase farm income. These effects are further revealed in Appendix C figures.

#### 9.3.2 **Increasing the level of Australian demand for Australian product.**

The next largest increase in farm income comes from a simulated 10% in domestic demand for leviable vegetables relative to all other foods. Due to restrictions on

domestic supplies and some natural protection from imports, R&D that increases domestic demand would cause some increase in price initially. In time producers would produce more and may divert product destined for export to satisfy the rise in demand. However, even in the longer term, some increase in price is likely to remain.

This could mean that consumers are willing to:

- pay more for the same quantity because the product has been improved or made more attractive; and
- pay the same amount for a larger volume because they increase their preference for leviabile vegetables relative to other products.

The combination of increased production and slightly higher prices would raise farmer income. The details of these effects can be seen in the figures within Appendix D.

### **9.3.3 Increased level of foreign demand for Australian product.**

Expansion of export demand could have similar but lesser effects due to the relative smallness of the export market currently. Nonetheless, the impact would be sizeable relative to the small size of exports, because increased export demand would see some domestic product diverted to exports which would strengthen prices domestically as well. The details of these effects can be seen in the figures within Appendix E.

### **9.3.4 Increased total factor productivity of resources used on-farm.**

Changes in this area would result in:

- increases the output per unit of input;
- increases in yield;
- increases in economies of scale; and
- lower unit costs of production.

A 10% increase in total factor productivity on-farm is disappointingly small. The reason for this is because export markets are so small. If 10% more product is produced for the same level of input, disposing of the extra production on the domestic market will force prices down, forcing the gains to be given away to domestic consumers. There is no export market to absorb the increased output. The effects are demonstrated more fully in the figures within Appendix F.

## **9.4 Potential payoffs from vegetable R&D levy investment**

### **9.4.1 Relative impacts**



The Hi\_link Model shows the relative impacts on farm incomes in the year 2018/2019 of a 10% improvement above the expected (baseline) in the variables discussed above. Impact modelling demonstrates that the biggest gains from improvements in those areas come from transport, packing and handling margins and then domestic demand – without placing adjusted weightings on the outcomes of the impacts to demonstrate credible achievements.

#### 9.4.2 Maximum credible achievements

Consideration of the likelihood of success of R&D levy investment in the particular areas must also be undertaken.

Based on the modelling and the review of the industry, it is considered that the maximum possible achievements from R&D in the specific key priority areas are as follows:

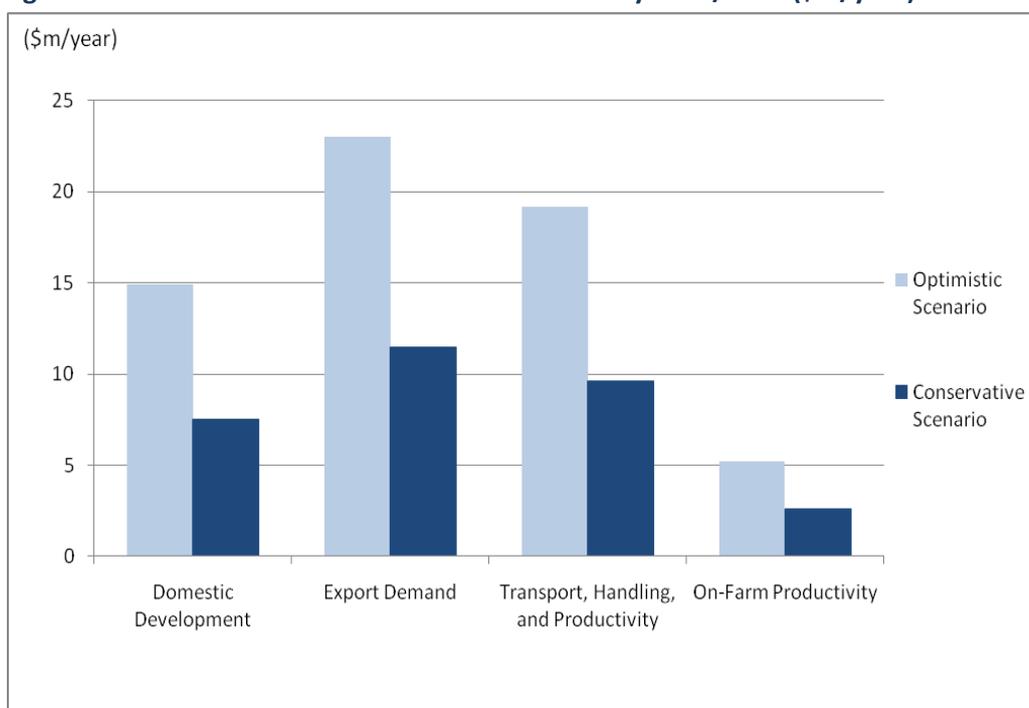
- Transport, handling and packing margins could be reduced by perhaps 1% a year for 10 years, reaching 10% in the 10th year.
- Relative to other developed countries, it is difficult to see domestic demand being expanded by 10% over and above the current rate of growth built into the baseline. So an outcome of an additional 10% would be exceptional.
- Although exports are currently small and Australia's competitiveness is questionable, the scope for growth is virtually unbounded and other countries have achieved annual growth rates of 10% a year. Australia has so many micro climates and so many possibilities, assuming competitiveness cannot be mastered in some area in a world of increasing specialisation and trade is also difficult to accept. A doubling of exports from such a small base is not therefore considered out of the question.
- Currently total factor productivity growth in Australia is low at around 1% per annum and about half what is being achieved in other countries. Doubling productivity growth is not out of the question so that an additional 10% growth could be achieved over the next decade. However, as revealed in the previous discussion, the incentives for productivity growth are minimal for products with no export prospects. It is unlikely that a doubling in the rate from 1% to 2% would be achieved for more than half of the products. Therefore a more realistic growth rate may be 1% a year for half the products.

According to CIE modelling, were these maximums achieved by the tenth year of R&D, benefits in terms of value added on farm could expand by \$19.2 million (10% margins), \$14.9 million (10% domestic demand), \$23 million (10 times 10% exports) and \$5.2

million (selective 10% productivity for half the products), totalling \$62.5 million a year by the tenth year.

More realistically, maximums will not be achieved. Achieving half this success would suggest an **annual benefit of around \$31.5 million after the tenth year**. Figure 26 illustrates expected increases per year to aggregate vegetable grower income, given the aforementioned scenarios; which were input into the Hi\_Link model.

**Figure 26 - Forecasted Increase to Grower Income by 2018/2019 (\$m/year).**



*Data source: Hi\_Link model.*

## 9.5 The alignment of R&D levy spending with the strategic priorities

### 9.5.1 Avoidance of negative productivity

An additional benefit may be the avoidance of negative productivity. Negative productivity can arise from natural rate decay in technical and market effectiveness due to generic drift, diseases immunity and resistance, weeds, changing community standards, relating to natural resource, degradation in natural resources, and capital and labour obsolescence. Rates of decay of 0.5% can occur in agricultural systems. Over a ten year period this could accumulate to around a 5% productivity loss being avoided, potentially worth \$2.6 million (as previously defined).

### 9.5.2 Mapping R&D programs

There are some programs and projects that correspond to certain economic gains and others that do not. This provides some logic to where the economic gains might arise from and the relative proportions of spending of the R&D Levy. The CIE impacts have been aligned to the strategic priorities, providing an indication of the relative weights of the strategic priorities (see Appendix G).

However, assumptions have needed to be made about the relative economic impacts that can be achieved from particular programs, based on the review of the industry.

CIS have conducted a qualitative assessment of the impacts based on the review and the findings in this report (see Appendix H for the qualitative impact assessment) resulting in similar weightings to the ones provided by CIE's economic modelling; therefore verifying the reasonableness of the CIE model and allocations. The proposed spending allocations were then presented to the IAC and made available to all levy paying growers for feedback. The draft strategic priority allocations were presented to the major grower regions throughout the country and a levy payer survey was distributed at each event. The allocations were presented as follows:

- **Consumer Demand: 54%;**
- **Market Development: 22%;**
- **Farm Productivity: 17%; and**
- **Resource use: 8%.**

Feedback from growers, HAL, the IAC, and the PIB were evaluated and considered. The outcome of this feedback was that growers generally endorsed the strategic priority areas and supported the idea of focusing more funds to off-farm issues than previously. However, 52% of surveyed levy payers sought that the proposed weightings around Consumer Alignment and Non-farm Development be slightly

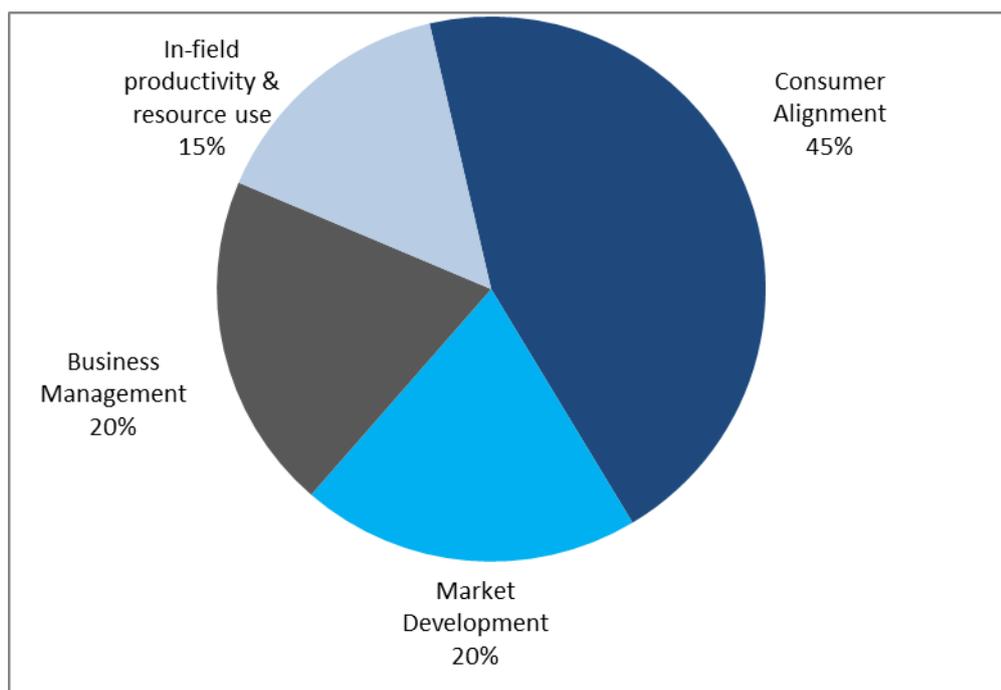


shifted back towards Farm Productivity and Resource Use proposing 19% and 13% weightings, respectively, on a weighted average basis. Since this feedback, the descriptions of the strategic priority areas and supporting programs have been further refined.

**Recommendation 6: R&D levy spending is allocated to the strategic priorities of the Strategic Plan using the following proportions as guidance<sup>49</sup>:**

- **Consumer Alignment: 45%;**
- **Market & Value Chain Development: 20%;**
- **Business Management: 20%; and**
- **In-field productivity & resource use: 15%.**

**Figure 27 - Proposed R&D Funding Allocation across Industry Priorities**



The recommended investment proportions are expected to be guidelines for allocating the R&D levy funding, after operational costs and commitments to the industry development Drive Train (an implementation issue) are incurred. The decision-making for project funding should be made on a case-by-case basis, with current industry topics/threats considered as well as the feasibility of project success.

<sup>49</sup> The refinement of these strategic priority areas since the development of the impact modelling may also have some minor bearing on these allocations.

Therefore, allocation targets should be considered acceptable if actual funding proportions are to within 10% of the strategic plan recommendations. This should allow the IAC flexibility to use levy funding to respond to any significant emerging issues that may need immediate action.

## 10. Key Performance Indicators for the industry

### 10.1 Key measurements of the performance of the industry

To monitor and understand the industry's progress toward meeting this vision, key performance indicators must be identified and quantified. These will be used to (1) measure progress, (2) recognise achievements, and (3) identify opportunities to change and improve.

Figure 28 below illustrates the key performance metrics that have been selected to align with the strategic investment plan's vision and four industry priorities.

A balanced set of measures should be available to reflect the overall performance of the industry. In developing these performance measures consideration was given to the following criteria:

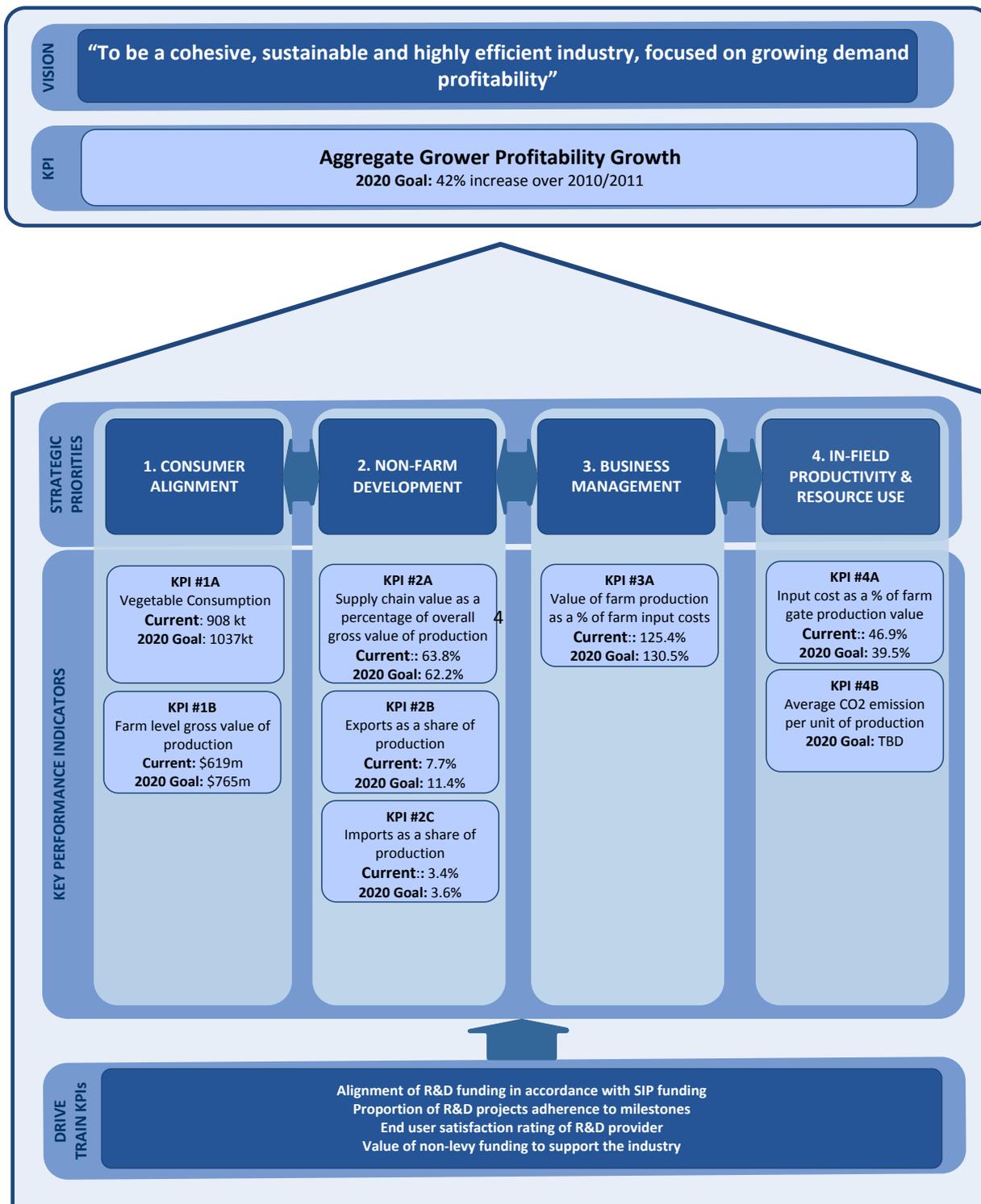
1. the alignment of the measures to the overall vision for the industry;
2. the feasibility of tracking the performance measures;
3. whether the measures could be influenced by the levy and the broader SIP;
4. whether the measure is important;
5. if the measure was understandable to stakeholders in the industry; and
6. whether the measure occurs often enough to be tracked and displayed.

Measures of performance have been established giving consideration to the current performance of the industry and what should be achieved based on the successful implementation of the SIP. These benefits are in today's dollars and do not include future inflation.

Figure 28 below outlines the overall measures of performance for the industry, the strategic priorities and for the drive train. Performance measures include the current and expected performance levels based on successfully implementing the SIP.

**Recommendation 7: Accept the following KPIs and supporting goals for the vegetable industry.**

Figure 28 – Key Performance Indicators



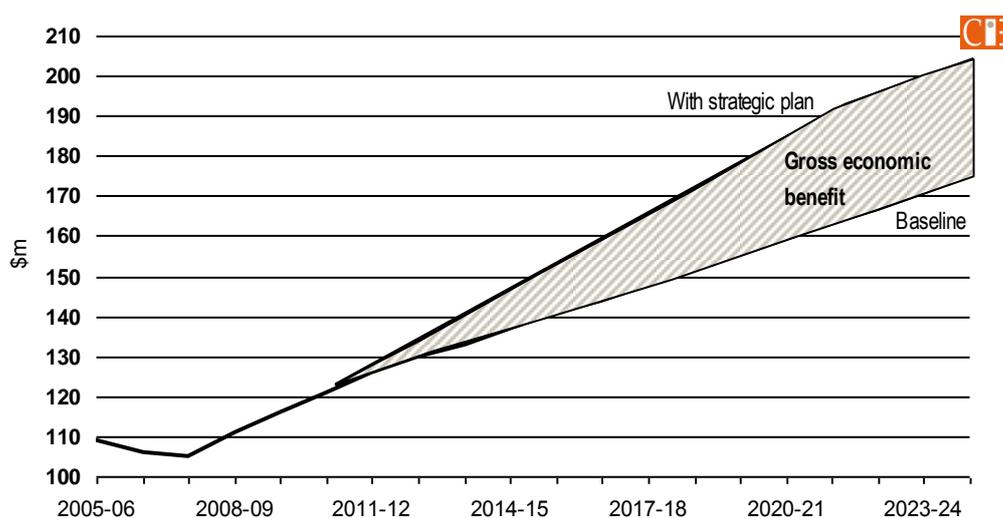
Drive train measures will ensure progress and adherence to the extension and implementation aspects of the SIP. Together these should be a major catalyst for achieving the vision for the industry.

## 10.2 Overall Australian vegetable industry KPI

Were the sorts of gains discussed above, achieved after 10 years based on the ‘credible possibility’ and maintained for five years after that, the gross benefits from the strategic plan would accumulate over and above the baseline scenario as shown in Figure 29.

Over a 15 year period this would accumulate to over \$300 million in nominal terms, but discounted at 7% would accumulate to present value of \$196 million. This is before costs of the program are deducted.

**Figure 29 - Expected gross economic gain from R&D relative to baseline: profit growth.**



*Data source: Hi\_Link model.*

If levy funding is allocated successfully and aligned to the strategic priorities outlined in the SIP, then the industry should achieve its overarching goal to increase aggregate grower profitability by 42% (from \$126 million in 2011/12 to \$179 million in 2019/20). This will be the overarching measure of performance which all other performance indicators should be directed. Profitability was found to be the key measure of success for levy payers. Assigning this to the value of production reflects most closely the performance of farmers in the vegetable industry.

**Recommendation 8: The industry adopts the overall target of increasing aggregate grower profitability by 42% (from \$126 million in 2011/12 to \$179 million in 2019/20).**



### 10.3 Strategic priority and drive train KPIs

The basis for each of the key performance indicators are outlined in Figure 30.

**Figure 30: Key Performance Metrics**

Key Performance Metrics	Rationale
<b>1a. Consumption increase above the rate of population growth</b>	It is vital that the industry is able to understand and meet changing consumer preferences. Consumption increases are expected from population growth which cannot be attributed to the success of the SIP. Consumption increases above this rate reflects the real performance of initiatives in this area.
<b>1b. Gross value of production</b>	The gross value of production considers both the quantity of production and price. Production increases typically serve to lower prices. The measure of value considers prices received by growers.
<b>2a. Farm gate value as a % of overall consumption value</b>	The farm gate value of the vegetable industry, relative to other horticulture sectors, comprises of a relatively small share of the overall market value of vegetables. In horticulture, the value of farm gate produce is generally over 50% of the total value of the industry. In the vegetable industry it is approximately 1/3. It is important therefore that the industry is able to implement initiatives that will reduce post farm gate costs or increase the proportion of value received by the farmer (based on the ratio of farm gate prices to retail prices).
<b>2b. Exports as a share of production</b>	Exports, although not the specific focus of this SIP, represents a major opportunity for the industry. If the industry achieves its vision and implements the objectives of the SIP, greater export penetration in time will be a logical consequence for the industry.
<b>2c. Imports of fresh vegetables as share of production</b>	Imports of fresh vegetables have increased significantly since 2005. This trend poses a major threat to the industry. Defending against these imports is a key priority. This should be a consequence of the implementation of the SIP.
<b>3a Value of farm production as a % of farm input costs</b>	As on farm production accounts for approximately 1/3 <sup>rd</sup> of the value of the vegetable industry and is directly within the control of the farmer. It is important that vegetables are produced as efficiently as possible.
<b>4a Input costs as a % of farm gate production value</b>	Reducing input costs will play an important role in levy payer's profitability. Increasing the price or quantity of production or reducing the costs of inputs will all add to profitability.
<b>4b Average CO2 emissions</b>	Sustainable environmental practices are becoming increasingly important for the industry. At the time of writing the Federal Gov't had recently announced a 'Carbon tax'. Reducing greenhouse gases is a key measure of environmentally sustainable practices.
<b>5a Alignment of R&amp;D funding</b>	This will ensure that funding does not gravitate back too heavily

<b>in accordance with SIP funding</b>	into traditional on-farm projects.
<b>5b Proportion of R&amp;D projects adherence to milestones</b>	The SIP has processes to ensure projects will be of value. A specific measure of projects being completed on time and adhering to their stated objectives should help maximise the impact of projects.
<b>5c. End user satisfaction rating of R&amp;D provider</b>	This will provide value market intelligence to the IAC when considering projects and will help drive a culture of developing and delivering projects that maximise the impact for levy payers.
<b>5d. Value of non-levy funding to support the industry</b>	There are a range of non-levy funding sources such as federal and state government grants, R&D investment programs, co-investment by research providers, and philanthropic sources, which could leverage levy funds. Accessing these funds also reflects linkages into other stakeholder groups and in part reflects progress in terms of building a more cohesive industry which is a key objective of the vegetable industry vision.
<b>5e. Compliance with SIP implementation</b>	This will ensure the SIP is implemented. The implementation of the SIP will maximise the chances of the vegetable industry achieving its vision.

Drive train measures will ensure progress and adherence to the extension and implementation aspects of the SIP. These combined with the balanced set of industry performance measures should together be a major catalyst for achieving the vision for the industry.

## 11. Is the decision-making process for the vegetable levy sound?

Whilst the governance arrangements for the Strategic Plan and SIP are operational in nature and beyond the scope of the Strategic Plan and SIP, the governance structures and processes were a significant issue raised by interviewees throughout the course of the consultations.

Governance and structural arrangements are key drivers of outcomes of the Strategic Plan and SIP, because they underpin whether outcomes can be efficiently and effectively implemented. Some of the issues with respect to governance arrangements which were raised during the course of the consultations are discussed below.

In general, it is recommended that the vegetable industry gives thought to how the governance arrangements might be improved to ensure the efficient and effective delivery of the Strategic Plan and SIP outcomes.

### 11.1 Industry Advisory Committee

The vegetable Industry Advisory Committee (IAC):

- advises the HAL Board on issues related to the vegetable industry sector;
- oversees, subject to the HAL Board's direction, the R&D program design and development;
- ensures that a Strategic Plan and Annual Investment Plan are prepared for the HAL Board's acceptance and implementation; and
- prepares an annual report for submission to the HAL Board.

According to HAL and AUSVEG, the members of the current IAC were chosen to have a representative for each state, as well as holding a diverse range of skills, backgrounds, and expertise. The standing members of the IAC are:

- Kent West (Queensland);
- Roger Turner (Victoria);
- Dr. Kevin Clayton-Greene (Tasmania);
- Danny De Ieso (South Australia);
- Denise Ellement (Western Australia);
- Peter Ward (New South Wales);
- Jeff McSpedden (Independent chair);

- Richard Mulcahy (Ex Officio AUSVEG);
- Mark Napper (Ex Officio AUSVEG); and
- Will Gordon (Ex Officio HAL).

As outlined previously, modelling of the economic impacts of innovations in the vegetable industry has identified some of the greatest impacts from R&D levy investment comes from investment in non-farm issues. This is also consistent with the previous Business Case for VegVision 2020. Accordingly, in order to realise the opportunities beyond production issues, consideration might be given to how the IAC membership could more easily take advantage of a broader range of stakeholder expertise across the vegetable industry. For example, very large growers and supply-chain experts might be able to provide input on issues such as:

- return on investment in various areas such as mechanisation, crop strains, production processes, development of novel products, consumer analysis, marketing etc.;
- supply-chain integration and how this might be better developed including understanding how to access and deal with retailers;
- access to export markets and how those might be developed; and
- development of new markets (e.g. through novel products or GAP analysis).

In addition, the IAC are provided with extensive documentation to support project proposals. Many project proposals have technical components which may not normally be understood by someone outside of that domain. It may be unrealistic to consider that the IAC will be capable of assessing and comparing every project that have extensive technical components. Accordingly, a technical advisory group structure, like that which has been developed in other sectors, might be considered in the future for the vegetable industry.

## 11.2 Role of AUSVEG

AUSVEG was formed in 2004 to represent vegetable growers in Australia. Levy payers are able to be non-voting members of the company.

According to its website, AUSVEG has three roles:

- 1. Agri-political advocacy and representation on behalf of vegetable and potato growers.**
- 2. Research and Development (R&D) associated services:**

Establish a case for a levy, seek a mandate from growers and make submissions to the Australian Government. Levies in place supported by AUSVEG are the National Vegetable and Potato Levies.

Recommend Industry Advisory Committee (IAC) members to Horticulture Australia Limited (HAL) for the purpose of making decisions on annual investment in the National Vegetable and Potato Levies.

Levy investment consultation process. AUSVEG is responsible for administering the process that provides a recommendation from industry to HAL on where the National Vegetable and Potato Levies should be invested.

General consultation- Under National Vegetable and Potato Levies, AUSVEG provides broad consultation on behalf of industry on issues such as biosecurity.

- 3. Service Provision**

AUSVEG delivers national projects in the areas of communication and environment on behalf of industry, funded from a wide variety of sources including Government grants, sponsorship and levies.

As the Peak Industry Body (PIB) of the vegetable industry, AUSVEG with HAL under a partnership agreement delivers secretariat services for the Industry Advisory Committee, communications contracts, and also undertakes other projects to deliver services such as:

- Providing study tours;
- Convening the Annual Levy Payers Meeting; and
- Conducting general consultation between AUSVEG and industry members on all matters relating to the ongoing development and implementation of the vegetable levy program.

### 11.3 Working and Advisory Group structure

Working and Advisory groups have been implemented to replace commodity based Focus Groups. This structure was seen to reduce the potential for overlap and duplication on projects that could be common across past commodity based groupings. There are 4 Advisory Groups and 5 Working Groups with a total of 75 members across these 9 Groups.

Advisory Groups have been established in the following areas:

- Production Advisory Group;
- Information Technology Development and Dissemination Advisory Group;
- Market Development and Consumers Advisory Group; and
- Leadership and People Development Advisory Group.

Working Groups are in the following groups:

- Chemicals Working Group;
- Environmental Working Group;
- Integrated Pest Management Working Group;
- Biosecurity Working Group; and
- Protected Cropping Working Group.

The distinction between Production Advisory and Working Groups are that Working Groups are intended to be a sub-set of the Production Advisory Group, to identify specific production issues. As a result of this structure, there are more groups and more resources directed at production related issues such as chemicals, pests and the environment. This structure may also contribute to the R&D levy spending being concentrated into production-related issues.

Working Groups in part were intended to provide advice from people with diverse skills, experiences, commodities and geographic regions. One of the benefits of such a broad cross-section of representation and skills is that buy-in is obtained for projects and there is a diverse range of representation and skills sets.

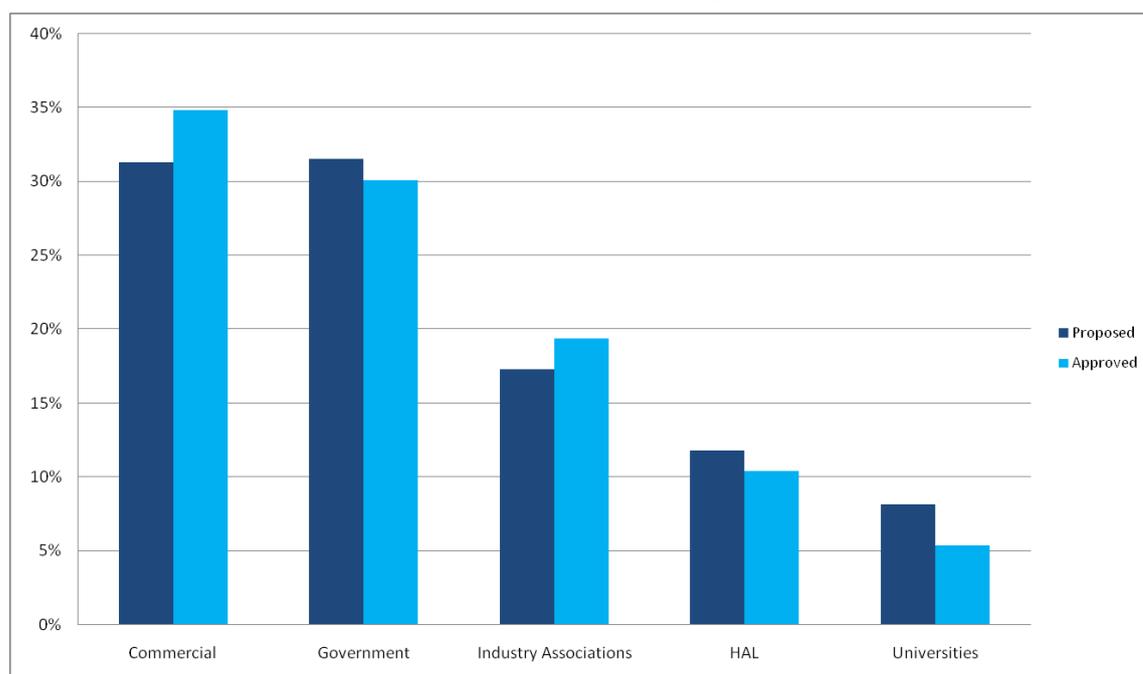
However, anecdotal evidence suggests that because there are so many representatives and so many groups, there may be opportunities to improve and streamline the processes. It is recommended that the vegetable industry considers aligning the advisory and working group process to the Strategic Plan and SIP to ensure the capability to deliver the required outcomes.

### 11.4 Service providers/researchers

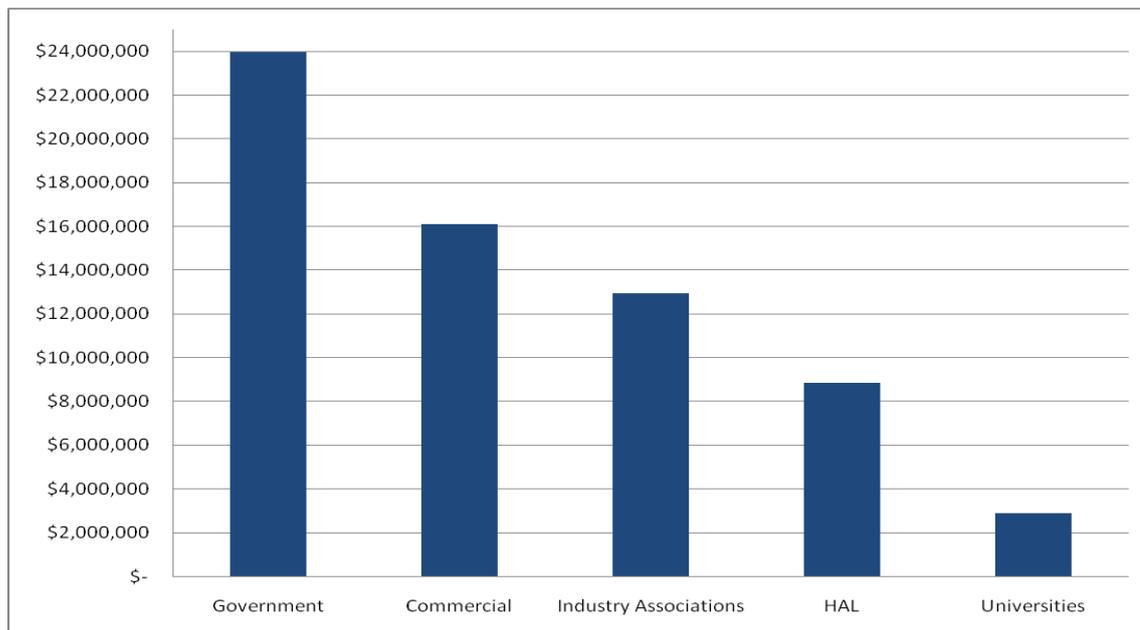
Analysis of the lead service providers was performed to gain insights into the state of the project selection process as well as an understanding of the quality and nature of the project proposals. Projects should be driven by the key opportunities and threats of the industry and the selection of projects should be highly selective to ensure that levy funding is invested on projects with the highest expected returns to the industry.

Currently, project proposals can be made by anyone with an idea for R&D in the industry. This includes state as well as commercial organisations. Normally, several parties are involved in any project, but a lead provider is designated for each.

**Figure 31 - RD&E Projects since 2006 by Project Lead Category**



**Figure 32 - Levy Funds Approved Since 2006**



Figures 31 and 32 and illustrate who the major categories of service providers leading potential projects have been since 2006. The data demonstrates a balanced mix of Industry, Government, and Commercial service providers leading the proposed projects over the last five years. However, University led projects are less represented and funded than expected. The project approval process also seems to favour projects led by Industry and Commercial service providers, since their proportion of approved projects is greater than their proportion of bids.

Since 2006, roughly 350 projects were approved a total of about \$65 million (\$13 million per year). This results in an average of less than \$200 thousand per project. This figure is particularly interesting when we look at our research showing that many of the more reputable researchers admitted to being more willing to undertake different, more substantive projects (e.g. gene mapping) from levy funding, but are deterred because the average R&D project size is relatively small and often accompanied with highly complex and time-consuming approval processes.

The criteria and processes for assessments of projects could more specifically identify the projects desired by the industry, giving greater guidance to researchers about the needs of the industry. Additionally, if projects are end-user driven, this may enhance the prospects of ensuring that researchers are well known and have good communication links with levy payers. Also, if research has a demonstrated impact and is tied to the strategic priorities of the industry, this may ensure that R&D spending is aligned with the SIP and that spending is larger

and long-term.

### **11.5 Assessment criteria for R&D funding applications**

It is not surprising given the size and breadth of the vegetable industry that they receive a significant number of R&D project applications. There are concerns that:

- there are a plethora of project proposals;
- they are often highly complex and difficult to assess because they are not written in plain English and do not meet clear assessment criteria; and
- insufficient time has been given to review project proposals.

There is a risk that some projects may not be given full consideration or may be recommended, when they should not be, because the system does not standardise the applications or ensure that the proposals clearly meet specified criteria. Systematic methods to help Working and Advisory Groups to examine proposed projects and their service providers may therefore enhance the prospects of selecting high value projects and recommending them to HAL. A tender process, for example, might be considered in the future as a more competitive and systematic method for achieving that result.

Applicants are required to fill-in a template application form<sup>50</sup> in order to apply for R&D funding. This requires applicants to specify which government priority or it satisfies and which industry portfolio category it meets. Applicants must also (amongst other things) describe the objectives, problem, resources needed, method, outputs and outcomes (measurable benefits and how they will be evaluated), commercialisation costs, industry adoption, budget and milestones.

A key issue raised was the ability to ensure that levy payers were receiving the benefits, and had a clear understanding of the research that is being conducted. A key factor in projects that had been successful (such as the sweet potato example - see section 7.2.1), was the involvement of end-users in the project proposals. Accordingly, it is recommended that the vegetable industry considers ensuring that specific criteria are used to assess project proposals - including that the proposed projects are:

1. aligned to the Strategic Plan and SIP priority areas;
2. end user driven with clearly demonstrated end users involved;
3. impact driven where the impact of the project success is declared by end users;
4. inclusive of risks and milestones;
5. relevant to end users and how end users the path to utilisation should be clearly

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<sup>50</sup><http://www.horticulture.com.au/librarymanager/libs/142/HAL%20Application%20Template%20General%20Call%2010-11-Final.PDF>

articulated;

6. inclusive of the impacts such as economic, social and environmental;
7. inclusive of the approach, budget and budget justification;
8. inclusive of practical extension components in the research programs (and where appropriate the commitment to summarise outcomes for growers in lay terms such as through fact sheets and précis within the VIDP's Knowledge Management System); and
9. inclusive of measures of extension performance.

## 12. Development and extension

### 12.1 Challenges with development and extension

The Strategic Plan and SIP suggests a major refocusing of the vision for the vegetable industry and the direction of R&D levy spending. The past implementation of initiatives in the vegetable industry has been problematic not only at the extension level but also at the strategic level. In fact many of the issues and recommendations made in this SIP are in many cases consistent with those of VegVision 2020 -however the implementation of the strategic imperatives outlined in VegVision 2020 may not have been fully realised.

At the project level, the initiation of the VIDP was in recognition of the difficulties the industry faced using traditional extension and development approaches. The success of the VIDP program in overcoming extension difficulties is currently under review and some programs are contracted to finish in 2011 (see section 13).

Realising the vision for the vegetable industry will require strong oversight of the Strategic Plan and SIP, particularly in light of some of the impediments to effective extension which can be summarised as follows:

- Smaller enterprises are often family-owned businesses that have developed farming practices over generations; which make them more risk adverse in proactively adopting new innovations.
- Small family owned farms often do have aspirations of significant growth reducing their interest in the adoption of innovations.
- Innovations in the vegetable sector increasingly involve technically advanced solutions, such as breeding programs, packaging, protected cropping, and IPM strategies. Farmers typically have minimal formal training in these innovative areas making adoption difficult.
- The large number of levy funded vegetable crops, making it difficult to fund projects that have benefit across the entire sector.
- The geographic spread of vegetable growers who often have specific regional issues. This geographic dispersion makes direct engagement difficult.
- Relatively low levels of adoption of the internet which reduces the effectiveness of mass communication models.
- The variability in vegetable farm size and sophistication means that solutions need to be customized to the requirements of each farm.
- The large number of levy funded projects (currently 170 ongoing) makes it difficult to



find effective ways to communicate or for vegetables growers to find key outcomes.

- R&D projects often lack a genuine extension component.

The Vegetable Industry Development Program (VIDP) began in 2009 in response to the 'Industry Development Needs Assessment'; which highlighted serious gaps in the ability to communicate and extend R&D project outcomes to the relevant industry stakeholders. This was described as mainly due to a disconnection between research and commercial networks.

The Program intended to address this issue through a significant change in the development strategy, partly by shifting the function of project and industry information dissemination from a region based system to a system based on specialised expertise categories. The VIDP began with a vision of stimulating the commercial innovation process by supplying knowledge and insight to decision makers who influence how vegetables are grown, processed, traded, and marketed. This was also seen as a missing and vital link between research outcomes and industry extension.

According to the VIDP Operating Plan, in contributing to the industry's strategic investment plan the VIDP was established to achieve the following six results:

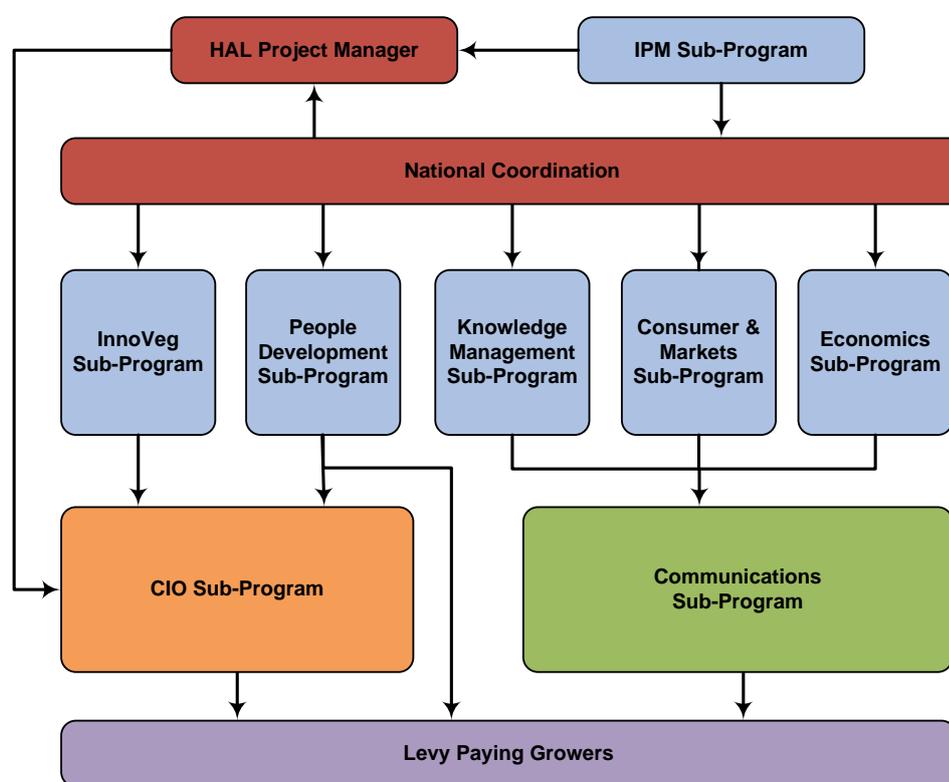
- industry is better able to communicate the benefits and qualities of Australian vegetable products to consumers;
- decision making in the industry is increasingly market driven;
- more growers are actively seeking to evolve their business model to meet new challenges posed by the market;
- findings and outputs from research are increasingly being applied by industry stakeholders in decision making;
- industry is using findings and outputs from research more effectively to formulate policy and manage the image of the industry; and
- a new generation of leaders are active in the industry.

The VIDP is intended to be a variety of projects managed under one centralised program. To carry-out these function the VIDP established a number of sub-programs to work together to provide tangible outputs. These now 8 current sub-programs are:

1. Knowledge Management;
2. People Development;
3. Consumers and Markets;
4. Integrated Pest Management;

5. Economics;
6. InnoVeg;
7. Collaborative Industry Organisations; and
8. Communications Support.

Unifying and managing these groups is the role of the National Coordination function, aimed at coordinating the various sub-programs under one umbrella (see Figure 33). **Figure 33 - Typical Communication Flow of the Vegetable Industry Development Program**



The industry’s developmental needs that were identified and addressed originally by the VIDP should continue to be recognised and addressed in future vegetable industry programs. Some of the key benefits (amongst many) are as follows:

**Centralised Source of Industry Information:** Anecdotal evidence suggests that much of the information that farmers receive about the market and consumers is through disparate avenues including retailers, wholesalers, agronomists etc., and that growers find a trusted and consistent source of information valuable. The AUSVEG website has contributed to overcoming this challenge, giving the industry an online source of data and insights to aide in the strategic decisions of the growers, commercial service providers, and the industry decision



makers.

**R&D Project Report Database:** The development of the Knowledge Management database under the VIDP is a valuable tool for addressing the gap between the laboratory and the farm and is currently being finalised. The précis created for each project helps put research terminology into everyday language to help growers understand the outputs that their levy funds have paid for. Growers can use the database to search for topics of interest and receive a summary of the projects that have come out of that field. The database is beneficial to industry decision makers by reducing project repetition.

**Formalised Extension/Communication Networks:** The communications program has been developed through the AUSVEG website, the use of the regional CIOs, articles within the various industry publications, faxed communications directly to farms, and holding workshops tailored to the various demographics and regions. Growers consider that they may be receiving information that is irrelevant to them, and because there is so much information that they sometimes have difficulty obtaining the information that they want. In an industry as diverse as vegetables, a sophisticated communications strategy is necessary to be beneficial to its members.

Some challenges put pressure on the ability for the VIDP to reach its potential, including a lack of clearly defined plan, structure and performance indicators as well as a complex structural arrangement. For example, there are currently multiple lines of reporting and layers of dissemination; which has limited its capabilities.

It is important for the vegetable industry to develop and maintain enduring capabilities around knowledge management, industry analysis and communications. The development of an efficient and effective development and extension program is crucial to deliver the 'Drive Train' function (Figure 19).

The structure should provide clear lines of communication and reporting, with less levels of bureaucracy. The decreased number of service providers means less fragmentation, more knowledge sharing, and therefore increased efficiencies. Accordingly, it is recommended that the vegetable industry considers implementing a development and extension structure that has minimal functional overlap, reduced lines of reporting and increased communication flows.

The vegetable industry should consider whether outsourced administration of the national co-ordination function is most effective and efficient.

The consultations also highlighted that a barrier to communicating with and delivering to the levy paying growers may be a lack of a comprehensive grower database. The sentiment in the industry is that a lack of a relevant database is a major roadblock for segmenting, targeting, and delivering the information that would be useful to them. Evidence suggests that the

majority of growers are not actively seeking the information provided and therefore the development and extension program needs to deliver it to them. This requires an understanding of the demographics of the industry as well as a relevant, useful, and maintained levy payer database. The industry could consider the development of a complete and detailed grower database (e.g. through surveys distributed during the AUSVEG website registration process).

## 12.2 Review of Industry Development Officers (IDOs)

Prior to the current centralised national Vegetable Industry Development Program (VIDP) which began in 2009, the structure of the implementation for the R&D levy projects included a number of state-based Industry Development Officers (IDOs). Though funded nationally, they operated out of the state-based industry association head-quarters. IDOs were intended to facilitate the transfer and adoption of R&D project outcomes to industry and to communicate industry R&D investment priorities to AUSVEG and HAL.

The IDOs were established under the National Vegetable Industry Development Network (NVIDN). Prior to their establishment, it was considered that there was no coordination of the communication and delivery of outcomes from the R&D levy. The IDOs allowed communication and technology transfer to be managed, planned and coordinated.

The main role of the Vegetable IDOs included:<sup>51</sup>

- facilitate the development of the Vegetable Industry;
- facilitate transfer and adoption of relevant technologies and practices;
- increase grower awareness of information sources and services that aim at improved productivity;
- identify impediments to the progress of the Vegetable Industry and suggest potential solutions;
- assist in the implementation of the Australian Vegetable Industry Strategic Plan; and
- encourage and facilitate communication between researchers and growers

Key activities of IDOs included:<sup>52</sup>

- assist industry delegates in preparation for R&D committee meetings;
- organisation and involvement in industry events;

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<sup>51</sup> Dr Alison Anderson, NSW Farmers' Federation, 'Facilitating the communication and development of the Vegetable Industry in NSW', Project Number VG99053/VG07140, July 2009, p 6

<sup>52</sup> Dr Alison Anderson, NSW Farmers' Federation, 'Facilitating the communication and development of the Vegetable Industry in NSW', Project Number VG99053/VG07140, July 2009, p 6



- identification of industry R&D needs;
- publication and distribution of newsletters;
- facilitation of meetings with growers and researchers;
- maintenance of industry databases;
- training courses for growers;
- assist researcher providers to develop effective communication strategies;
- assist with the minor use permit program for agricultural chemicals;
- technical tours for growers; and
- formalisation and strengthening of regional grower groups.

Whilst IDOs were removed during inception of the VIDP program, anecdotal evidence from this review has identified strong support for the IDOs and their function. For example, growers benefitted from the IDOs because they had one point of contact for obtaining information about research projects and industry intelligence.

IDOs also had a good understanding of the region that they represented and the needs of growers specific to that area. IDOs had networks of contacts which could be used to obtain information, or to connect growers to. IDOs were also able to keep in contact with each other to share information and to develop research projects where there were common interests. There is also evidence that growers felt IDOs represented them at meetings (e.g. levy payer, HAL meetings etc.).

Other benefits of IDOs included their independence (due to funding on a national basis through HAL) and ability to generate end-user support for R&D projects. Additionally, IDOs by being 'on-the-ground' in a specific area, can achieve greater grower awareness and trust in what is a fragmented, geographically and culturally diverse industry.

However, there were a number of problems with the previous IDO structure. These include that:

- the roles and responsibilities of IDOs were not clearly defined, which meant that they may have been asked to undertake activities beyond the scope of their role (such as state-based activities that were not related to the R&D levy projects);
- the work might not have been clearly aligned to the SIP goals and priorities; and
- project outcomes and budgets may not have been clear as there weren't clear structures and strategies in place for communication and alignment of goals between IDOs, HAL and AUSVEG.

In considering the appropriateness of IDO's as part of the industry's extension capability issues around whether R&D levy funding for IDOs actually meets a market failure. At present the agronomists in the industry appear to have stepped in to meet the needs of growers about advice on various pest control mechanisms. Various organisations such as IPM Technologies (which is a private company) provide advice to individual growers on their farms. Some state based associations like Western Australia also fund an IDO role because they see the contact with regions as valuable. Therefore, the IDO role is partly filled in those areas or regions that see value in the IDO role. There is also a considerable risk - with IDOs funded through the R&D levy - that a similar situation to the previous IDOs would occur, with a possibility that the high-level strategic issues and SIP would be forgotten at the expense of smaller, less strategic but more pressing issues. It is also difficult to ensure that in all regions, capable and long-term IDOs will be attracted and retained to the role, unless they are well funded and resourced.

Given the limited resources of the R&D levy, then it is advised that the vegetable industry recognises the wide held support for the IDO's by levy payers, and therefore decides whether reinstating IDOs as part of a "Drive Train" structure discussed above, would provide an adequate return on investment.

### 12.3 Industry Cohesiveness

Achieving the strategic objectives of the industry will require key stakeholders to be fully engaged and aligned to the strategic priorities of the industry as outlined in the Strategic Plan and SIP. It is difficult to see how the strategic objectives can be achieved if there isn't a uniform vision, supporting governance arrangements, elimination of duplication of effort and resources or even worse, activities that operate to undermine the objectives for the industry. During our review concerns around the lack of cohesiveness in the industry was expressed at nearly all levels. Our investigations found support for these assertions. For example, our review identified a lack of alignment throughout the industry in the following areas:

- State-Based Vegetable Associations are funded separately. Whilst some associations aligned their strategic priorities with the industry investment plan, others operate independently of the plan. They were found to largely operate independently of AUSVEG and did not coordinate their activities around strategic priorities for the industry.
- Large growers who have strategic thinking and valuable experience to contribute to the industry are not sufficiently engaged and were reluctant to become engaged in the industry.
- Smaller growers' needs varied considerably depending on the operations of their farm.
- Many leading researchers and research organisations with large resources and teams (such as CSIRO and universities with high ERA ratings are not heavily represented in the



vegetable industry – the common explanations for their lack of engagement included projects being short-term focused, of relatively small dollar value, lacked strategic direction, would not deliver significant impact, approval processes were slow and overly bureaucratic.

- Independent organisations that provide services and implementation activities to the industry were not aligning their operations to the strategic priorities of the industry. The services and activities of independent organisations should be encouraged to be aligned to the goals of the vegetable industry and better communication and alignment should be sought to maximise the effort and resources of the industry.

The vegetable industry should consider how cohesion can be better achieved, including by encouraging the state grower associations to align to the Strategic Plan and SIP.

## 13. How should R&D levy money be allocated?

### 13.1 What is the projected availability of funds going forward?

Figure 35 shows the amount of vegetable levy that has been collected by the LRS between 2001/2002 and 2009/2010 and provides a forecast figure for 2010/2011.

**Figure 35 - Vegetable R&D levy collected between 2001-02 and 2010-2011**

Financial Year	Levy Collected	Total After Government Match
2001/2002	\$4.1m	\$8.2m
2002/2003	\$5.0m	\$10.0m
2003/2004	\$5.0m	\$10.0m
2004/2005	\$5.0m	\$10.0m
2005/2006	\$5.6m	\$11.2m
2006/2007	\$5.5m	\$11.0m
2007/2008	\$6.3m	\$12.6m
2008/2009	\$6.5m	\$13.0m
2009/2010	\$6.5m	\$13.0m
2010/2011 (Projected)	\$6.5m	\$13.0m

*Note: Source: HAL 2011-06-10. Matched column is CIS estimate for presentation purposes.*

In recent years, levy revenue has been roughly \$6.5 million, bringing total revenue (including government matching) to around \$12-13 million annually. Recent annual operating expenditures, including HAL corporate costs, levy collection costs, across industry contributions, and IAC coordination are in the range of \$2.5-3.0 million each year; which brings the funds available for investment in industry RD&E to approximately \$10m annually.

Projects committed to industry development, communications, and industry surveys historically require an additional \$3 million annually. This expenditure supports the 'Drive Train' initiatives, and would be expected to include projects that maintain the capabilities and knowledge of the industry, such as:

- ABARE and ABS statistics (and these are important to ensure the KPIs are able to be measured);
- continued development of the web portal to make it more user friendly;

- continued development of programs to ensure that there is effective and efficient communications to levy payers and knowledge management systems.

Therefore, funding available for researching consumers/markets, exploring new production and product technologies, advancing chemicals and IPM strategies, and the like, is projected to be an estimated \$7 million per year of levy investment.

### ***13.2 Effects of the Proposed Strategic Investment Structure***

The proposed priority allocation is heavily weighted in Consumer Alignment projects, followed by Non-farm Development, Business Management, and lastly In-field productivity & resource use. As Figures 36 and 37 illustrate, meeting this new investment structure requires a significant shift in the strategic focus for the vegetable industry and will take a conservative estimate of 2 to 3 years to establish fully. This is considering the current contractual commitments in place which have already been allocated levy funding through fiscal year 2013/2014. These figures are shown in detail in Figure 36 and based on an estimate of \$7 million available for research project allocation, as derived in section 13.1.

**Figure 36 - Estimated Annual Levy Funds Available for Allocation per Priority Category**

	2011/2012	2012/2013	2013/2014	Beyond
<b>Customer Alignment</b>				
Priority Rate	45%	45%	45%	45%
Total Annual Research Funds*	7,000,000	7,000,000	7,000,000	7,000,000
Share of Funds	3,150,000	3,150,000	3,150,000	3,150,000
Allocated Levy Funds	369,062	270,230	77,180	-
Available for Allocation	2,780,938	2,879,770	3,072,820	3,150,000
<b>Market &amp; Value Chain Development</b>				
Priority Rate	20%	20%	20%	20%
Total Annual Research Funds*	7,000,000	7,000,000	7,000,000	7,000,000
Share of Funds	1,400,000	1,400,000	1,400,000	1,400,000
Allocated Levy Funds	338,505	196,047	-	-
Available for Allocation	1,061,495	1,203,953	1,400,000	1,400,000
<b>Business Management</b>				
Priority Rate	20%	20%	20%	20%
Total Annual Research Funds*	7,000,000	7,000,000	7,000,000	7,000,000
Share of Funds	1,400,000	1,400,000	1,400,000	1,400,000
Allocated Levy Funds	35,781	-	-	-
Available for Allocation	1,364,219	1,400,000	1,400,000	1,400,000
<b>In field productivity &amp; resource use</b>				
Priority Rate	15%	15%	15%	15%
Total Annual Research Funds*	7,000,000	7,000,000	7,000,000	7,000,000
Share of Funds	1,050,000	1,050,000	1,050,000	1,050,000
Allocated Levy Funds	3,710,210	2,055,964	1,089,751	-
Available for Allocation	- 2,660,210	- 1,005,964	- 39,751	1,050,000

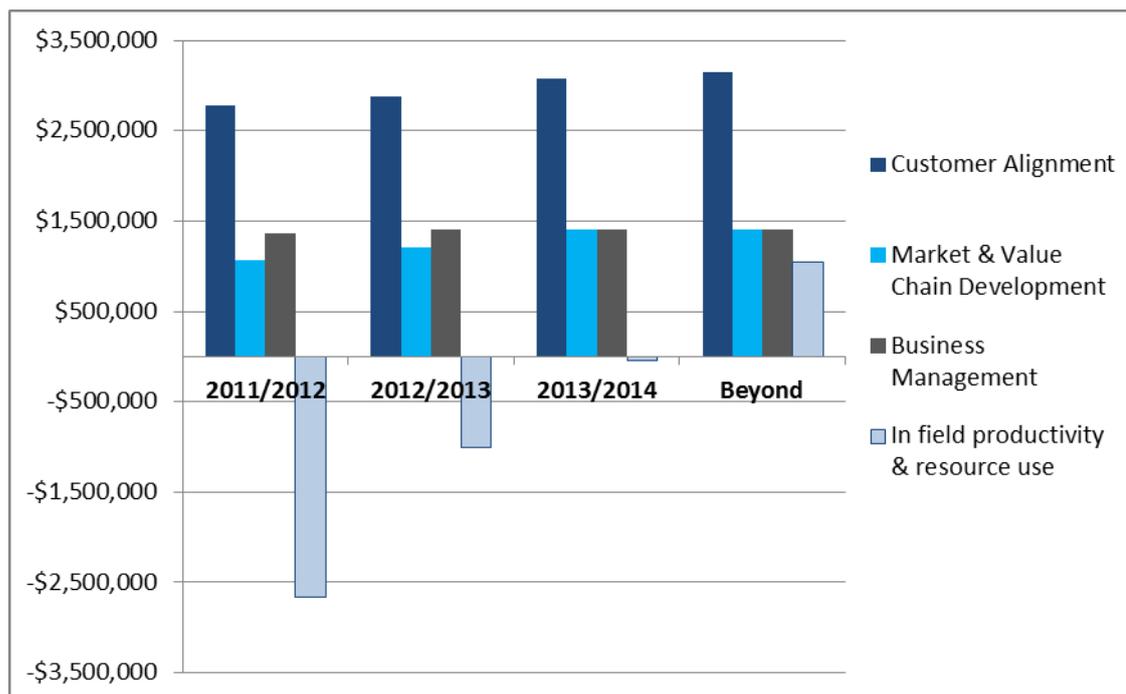
The most notable strategic change in terms of levy allocation is the shift in funds from -in-field productivity & resource use (e.g. pests, diseases, minor use, IPM, etc.) to projects that aim to achieve the priority of increasing consumer demand (e.g. achieving customer satisfaction, developing novel products, growing consumer demand, etc.). The 15% funding allocation to in-field productivity & resource use is lower than has historically been invested on issues involving plant health. As major pest and disease issues arise periodically within the industry, we recommend that levy project proposals be considered on a case-by-case basis; allowing the IAC flexibility to address any emerging industry issues that can be solved through the use of levy investment and without consideration for the established priority allocation targets. As such, no major issues within the industry should be neglected due to funding allocation parameters.

**Recommendation 9: Given the changes in R&D levy allocations proposed, levy funding beyond the target investment guidelines can be allocated where a reasonable project**



addressing a major emerging issue is justified. Projects should be evaluated on a case-by-case basis and reasons to deviate from the target allocations should be noted, significant, and reasonable.

**Figure 37 - Estimated Annual Funds Available by Priority**



Although Figure 37 demonstrates that the current allocation of funding among strategic priorities leaves a deficit in the in-field productivity & resource use category through 2014, it is not recommended that future available funding be prohibited from this category through 2014. Rather, a more gradual approach to the re-allocation is recommended; that as investment funding becomes available, it is allocated according to the proposed targets. This will make the shift in strategy a more gradual and manageable process, and it will ensure that funding remains available for worthy In-field productivity & resource use projects over the next few years.

## 14. Implementation

Given the many recommendations in relation to the Strategic Plan, R&D levy spending, KPIs for the industry and requirement to examine the governance and extension frameworks (amongst other things), it will be important to ensure that there is a clear and well defined implementation plan and oversight of this implementation plan.

Detailed and well considered project planning will provide clarity around the timing of activities and the person(s) responsible.

## 15. Recommendations

This White Paper has assessed the overarching strategic plan for the industry, the decision-making process for R&D levy spending, how the R&D levy spending and implementation has occurred to-date, how the performance of the industry should be measured and the key areas of spending which will achieve the desired industry performance.

This analysis has highlighted that clearly defined strategic priorities and goals are needed to guide R&D levy funding, to ensure that outcomes from the vegetable R&D investment are measurable, monitored and contribute directly to the goals of the industry.

This analysis has yielded 10 recommendations, which have been translated into the draft Strategic Plan and SIP for the industry. The recommendations from the review are outlined below.

**Recommendation 1:** The vegetable industry adopts the following vision: *“To be a cohesive, sustainable and highly productive industry focused on growing demand profitably”*.

**Recommendation 2:** The industry adopts the following four key strategic priorities: consumer alignment; market & value chain development, business management, and in-field productivity & resource use. The industry should also adopt an industry development drive train to support the functions for achieving these objectives.

**Recommendation 3:** Given the barriers to establishing a marketing levy, the range of activities to be implemented as part of the SIP, alternative funding for marketing investment potentially available, and the significance of other structural reforms outlined in this SIP, it is recommended that a marketing levy should not be pursued over the next 3 to 5 years.

**Recommendation 4:** Any consideration of a marketing levy should be supported by a full business case.

**Recommendation 5:** A pilot cooperative model should be trialled with the learnings used as a model for further extension into other regions of Australia that meet the aforementioned criteria for cooperative development.

**Recommendation 6:** R&D levy spending is allocated to the strategic priorities of the Strategic Plan using the following proportions as guidance:

- Consumer Alignment: 45%;
- Non-farm Development: 20%;
- Business Management: 20%; and
- In-field productivity & resource use: 15%.

**Recommendation 7: Accept the KPIs and supporting goals for the vegetable industry.**

**Recommendation 8: The industry adopts the overall aggregate grower profitability by 42% (from \$126 million in 2011/12 to \$179 million in 2019/20).**

**Recommendation 9: Given the changes in R&D levy allocations proposed, levy funding beyond the target investment guidelines can be allocated where a reasonable project addressing a major emerging issue is justified. Projects should be evaluated on a case-by-case basis and reasons to deviate from the target allocations should be noted, significant, and reasonable.**

Some key issues for the vegetable industry to consider in the implementation of the Strategic Plan and SIP are as follows:

- **Issue 1:** The governance arrangements and structures underpinning the Strategic Plan and SIP should be examined to ensure that they align with the Strategic Plan and SIP and will effectively and efficiently deliver outcomes.
- **Issue 2:** In addition to the current assessment criteria used by HAL and the IAC, the vegetable industry should consider ensuring that specific criteria is used in assessing project proposals including that the proposed projects are:
  1. aligned to the Strategic Plan and SIP priority areas;
  2. end user driven with clearly demonstrated end users involved. Involvement must include in kind or cash contributions;
  3. impact driven where the impact of the project success is declared by end users;
  4. inclusive of risks and milestones;
  5. relevant to end users and how end users the path to utilisation should be clearly articulated;
  6. inclusive of the approach, budget and budget justification;
  7. inclusive of practical extension components in the research programs (and where appropriate the commitment to summarise outcomes for growers in lay terms such as through fact sheets); and
  8. inclusive of measures of extension performance.
- **Issue 3:** A development and extension structure should be developed that has minimal functional overlap, reduced lines of reporting and increased communication flows. This would potentially also rationalise spending, allowing for redistribution of R&D levy funds amongst the strategic priority areas of the Strategic Plan and SIP.

- **Issue 4:** The vegetable industry should consider how cohesion can be better achieved, including by encouraging the state grower associations and other key stakeholders to align to the Strategic Plan and SIP.

## Appendix A – 12 Principles of Instituting a Levy

### The 12 Mandatory Principles of Instituting a Levy

1. The proposed levy must relate to a function for which there is a **market failure**.
2. A request for a levy must be supported by industry bodies representing, wherever possible, all existing and/or potential levy payers, the relevant levy beneficiaries and other interested parties. The initiator shall demonstrate that all reasonable attempts have been made to inform all relevant parties of the proposal and that they have had the opportunity to comment on the proposed levy. A levy may be initiated by the Government, in the public interest, in consultation with the industries involved.
3. The initiator of a levy proposal shall provide an assessment of the extent, the nature and source of any opposition to the levy, and shall provide an analysis of the opposing argument and reasons why the levy should be imposed despite the argument raised against the levy.
4. The initiator is responsible to provide, as follows:
  - an estimate of the amount of levy to be raised to fulfil its proposed function;
  - a clear plan of how the levy will be utilised, including an assessment of how the plan will benefit the levy payers in an equitable manner; and
  - demonstrated acceptance of the plan by levy payers in a manner consistent with Levy Principle 2.
5. The initiator must be able to demonstrate that there is agreement by a majority on the levy imposition/collection mechanism or that, despite objections, the proposed mechanism is equitable under the circumstances.
6. The levy imposition must be equitable between levy payers.
7. The imposition of the levy must be related to the inputs, outputs or units of value of production of the industry or some other equitable arrangements linked to the function causing the market failure.
8. The levy collection system must be efficient and practical. It must impose the lowest possible 'red tape' impact on business and must satisfy transparency and accountability requirements.
9. Unless new structures are proposed, the organisation/s that will manage expenditure of levy monies must be consulted prior to introduction of the levy.
10. The body managing expenditure of levy monies must be accountable to levy payers and to the Commonwealth.
11. After a specified time period, levies must be reviewed against these Principles in the manner determined by the Government and the industry when the levy was first imposed.
12. The proposed change must be supported by industry bodies or by levy payers or by the Government in the public interest. The initiator of the change must establish the case for change and where an increase is involved, must estimate the additional amount which would be raised. The initiator must indicate how the increase would be spent and must demonstrate the benefit of this expenditure for levy players.

## Appendix B – Key elements of Hi\_Link baseline for vegetable sector

	2005-06(kt)	2010-11(kt)	2011-12(kt)	2012-13(kt)	2013-14(kt)	2014-15(kt)	2015-16(kt)	2016-17(kt)	2010-17 Ave annual growth
<b>Production</b>									
Vegetables: fresh	2 005	2 088	2 125	2 156	2 184	2 210	2 235	2 259	1.3
▪ Leviale	926	963	980	994	1 006	1 017	1 028	1 037	1.2
Vegetables: processing	1 229	1 120	1 108	1 106	1 103	1 097	1 089	1 081	-0.5
▪ Leviale	141	114	112	111	109	108	106	104	-1.4
Vegetables: total	3 234	3 208	3 233	3 262	3 287	3 307	3 324	3 339	0.7
▪ Leviale	1 068	1 077	1 091	1 104	1 115	1 125	1 134	1 142	1.0
Processed vegetable products	702	640	633	633	631	627	623	618	-0.5
All horticulture excluding amenity	5 311	5 368	5 369	5 421	5 451	5 481	5 515	5 551	0.6
<b>Exports</b>									
Vegetables: fresh	165	143	156	164	168	171	172	173	2.9
▪ Leviale	82	77	84	89	92	94	96	97	3.8
Vegetables: processing	0	0	0	0	0	0	0	0	Na
Vegetables: total	247	220	240	253	260	265	268	270	3.2
Processed vegetable products	22	11	10	10	10	10	9	9	-3.2
All horticulture excluding amenity	457	491	548	579	595	602	611	618	3.4
<b>Imports</b>									
Vegetables: fresh									
▪ Leviale	44	57	58	59	60	61	63	64	2.0
Vegetables: processing	28	36	37	38	38	39	40	42	2.2
Vegetables: total	0	0	0	0	0	0	0	0	Na
Processed vegetable products	73	94	94	96	98	100	103	106	2.1
All horticulture excluding amenity	210	413	445	469	494	522	553	585	5.8
<b>Household consumption</b>									
Vegetables: fresh	1 251	1 315	1 327	1 338	1 349	1 360	1 372	1 384	0.9
▪ Leviale	708	749	756	762	768	775	782	789	0.9
Processed vegetable products	466	506	512	517	521	526	531	535	0.9
All fresh horticulture excluding amenity	2 362	2 605	2 648	2 675	2 705	2 731	2 758	2 785	1.1
Food service									
Vegetables: fresh	633	706	718	733	747	762	777	793	2.0
▪ Leviale	164	186	189	194	198	202	207	211	2.2
Processed vegetable products	424	493	505	517	530	543	557	571	2.5
All fresh horticulture excluding amenity	871	983	1 002	1 023	1 044	1 065	1 087	1 109	2.0

## Key elements of the Hi\_Link model baseline for vegetable sector (Continued)

		2005-06	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	Average annual growth 2010-17
<b>Total domestic and imported consumption per person</b>										
Fresh vegetables	kg	89	89	88	88	88	88	88	87	-0.2
▪ Leviale	kg	41	41	41	41	41	40	40	40	-0.3
Processed vegetables	kg	42	44	44	44	44	44	44	44	0.2
Horticulture	kg	153	157	158	158	157	157	157	156	-0.1
<b>Total domestic only consumption per person</b>										
Fresh vegetables	kg	87	86	86	86	85	85	85	85	-0.3
▪ Leviale	kg	40	39	39	39	39	39	39	39	-0.4
Processed vegetables	kg	32	26	25	24	23	23	22	21	-3.3
Horticulture	kg	145	147	144	143	143	142	142	142	-0.5
<b>Wholesale prices</b>										
Vegetables: fresh	A\$/kg	0.98	1.01	1.02	1.02	1.03	1.03	1.03	1.04	0.5
▪ Leviale	A\$/kg	1.13	1.15	1.15	1.16	1.16	1.16	1.17	1.17	0.4
Vegetables: processing	A\$/kg	0.21	0.20	0.20	0.20	0.20	0.20	0.20	0.20	-0.1
▪ Leviale	A\$/kg	0.20	0.17	0.17	0.16	0.16	0.16	0.16	0.16	-1.4
Vegetables: total	A\$/kg	0.69	0.73	0.74	0.74	0.75	0.75	0.76	0.77	0.9
▪ Leviale	A\$/kg	1.00	1.04	1.05	1.06	1.06	1.07	1.07	1.08	0.6
Processed vegetable products	A\$/kg	1.93	1.90	1.89	1.90	1.91	1.91	1.91	1.92	0.2
<b>Gross value of production: at wholesale prices</b>										
Vegetables: fresh	\$m	1 970	2 108	2 157	2 200	2 238	2 276	2 313	2 348	1.8
▪ Leviale	\$m	1 043	1 105	1 129	1 149	1 167	1 184	1 201	1 217	1.6
Vegetables: processing	\$m	261	226	222	222	221	220	218	216	-0.6
▪ Leviale	\$m	29	19	18	18	18	17	17	16	-2.8
Vegetables: total	\$m	2 230	2 334	2 379	2 421	2 460	2 495	2 531	2 564	1.6
▪ Leviale	\$m	1 072	1 124	1 147	1 167	1 185	1 202	1 218	1 233	1.5
Processed vegetable products	\$m	1 353	1 214	1 200	1 203	1 202	1 198	1 191	1 184	-0.3
<b>Gross value of production: at farm or factory prices</b>										
Vegetables: fresh	\$m	1 184	1 297	1 331	1 362	1 390	1 417	1 445	1 472	2.1
▪ Leviale	\$m	539	586	601	614	625	637	648	659	2.0
Vegetables: processing	\$m	261	226	222	222	221	220	218	216	-0.6
▪ Leviale	\$m	29	19	18	18	18	17	17	16	-2.8
Vegetables: total	\$m	1 983	2 108	2 153	2 197	2 236	2 274	2 311	2 347	1.8
▪ Leviale	\$m	568	605	619	632	643	654	665	676	1.8
Processed vegetable products	\$m	1 100	986	974	976	976	973	967	961	-0.3

## Key elements of the Hi\_Link model baseline for vegetable sector (Continued)

		2005-06	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	Average annual growth 2010-17
<b>Value added: excluding hired labour</b>										
Vegetables: total	\$m	280.3	297.6	305.6	314.3	321.7	328.9	335.9	342.6	2.4
▪ Leviale	\$m	108.9	121.0	125.6	129.8	133.4	137.0	140.7	144.1	2.9
Processed vegetable products	\$m	89.6	73.2	71.5	71.9	71.8	71.4	70.6	69.8	-0.6
<i>Value added costs as a proportion of GVP</i>										
Vegetables: total	%	14.1	14.1	14.2	14.3	14.4	14.5	14.5	14.6	
▪ Leviale	%	19.2	20.0	20.3	20.5	20.7	21.0	21.2	21.3	
Processed vegetable products	%	8.1	7.4	7.3	7.4	7.4	7.3	7.3	7.3	
<b>Hired labour</b>										
Vegetables: total	\$m	483.0	563.7	583.7	603.9	623.1	642.3	661.7	681.0	3.2
▪ Leviale	\$m	163.7	195.3	203.2	210.8	218.0	225.3	232.7	240.0	3.5
Processed vegetable products	\$m	157.0	157.8	158.5	161.5	164.1	166.2	168.0	169.7	1.3
<i>Hired labour costs as a proportion of farm level GVP</i>										
Vegetables: total	%	24.4	26.7	27.1	27.5	27.9	28.2	28.6	29.0	
▪ Leviale	%	28.8	32.3	32.8	33.4	33.9	34.4	35.0	35.5	
Processed vegetable products	%	14.3	16.0	16.3	16.5	16.8	17.1	17.4	17.7	
<b>Input costs</b>										
Vegetables: total	\$m	1 220.2	1 246.7	1 263.8	1 278.7	1 291.7	1 302.8	1 313.6	1 323.6	1.0
▪ Leviale	\$m	295.1	288.7	290.2	291.1	291.8	291.8	291.7	291.4	0.1
Processed vegetable products	\$m	853.0	754.6	743.7	742.8	740.0	735.3	728.7	721.8	-0.7
<i>Input costs as a proportion of GVP</i>										
Vegetables: total	%	61.5	59.1	58.7	58.2	57.8	57.3	56.8	56.4	
▪ Leviale	%	52.0	47.7	46.9	46.1	45.4	44.6	43.9	43.1	
Processed vegetable products	%	77.6	76.6	76.4	76.1	75.8	75.6	75.3	75.1	

Source: Source: Hi\_Link model.

## Appendix C – Off-farm margins

**Figure 1 10% reduction in packing, transport and handling margins**

		2007-08	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
Production: fresh	%	5.7	5.6	5.6	5.5	5.4	5.4	5.3	5.2	5.2	5.1
Production: processing	%	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3
Prices for fresh sales <sup>b</sup>	%	2.6	2.6	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Prices for processed sales <sup>b</sup>	%	-0.7	-0.6	-0.6	-0.6	-0.6	-0.5	-0.5	-0.5	-0.5	-0.5
Household consumption	%	2.9	2.9	2.9	2.8	2.8	2.8	2.8	2.8	2.8	2.7
Food service	%	6.8	6.8	6.7	6.7	6.7	6.7	6.7	6.7	6.6	6.6
Exports	%	33.3	31.6	30.4	29.7	29.1	28.7	28.3	28.0	27.6	27.4
Farm income	%	12.8	13.0	13.0	13.0	12.9	12.8	12.7	12.7	12.6	12.4
	\$m	15.5	16.3	16.8	17.3	17.7	18.1	18.4	18.7	19.0	19.2

Data source: *Hi\_Link model.*

Figure 2 reveals that carrots would be the single biggest winner from a 10% reduction in costs. This reflects its gross value of production (the largest among the group of leviable products) as well as its relatively high margins.

**Figure 2 - 10% reduction in packing, transport and handling margins (\$m) by products**

	2007-08	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
	\$m									
<i>Value added — farm income</i>										
Carrots	4.1	4.4	4.7	4.9	5.0	5.1	5.3	5.4	5.5	5.5
Pumpkins	2.1	2.2	2.2	2.3	2.3	2.4	2.5	2.5	2.6	2.7
Sweet corn	1.5	1.5	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.7
Peas and beans	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Lettuce	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.4	1.4	1.4
Broccoli	1.1	1.1	1.2	1.2	1.2	1.3	1.3	1.3	1.4	1.4
Cauliflower	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7
Capsicum nec	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2
Garlic and herbs	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Other vegetables	3.2	3.3	3.5	3.6	3.7	3.7	3.8	3.8	3.8	3.8
Total	15.5	16.3	16.8	17.3	17.7	18.1	18.4	18.7	19.0	19.2

Data source: *Hi\_Link model.*

## Appendix D – Domestic demand

**Figure 3 - 10% increase in domestic consumption (retail plus food service)**

		2007-08	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
Production: fresh	%	4.3	4.1	4.0	4.0	3.9	3.9	3.9	3.9	3.9	3.9
Production: processing	%	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Prices for fresh sales <sup>b</sup>	%	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1
Prices for processed sales <sup>b</sup>	%	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
Household consumption	%	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.3	4.3
Food service	%	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3
Exports	%	-13.4	-13.3	-13.3	-13.3	-13.4	-13.5	-13.7	-13.8	-14.0	-14.2
Farm income	%	11.3	11.0	10.7	10.5	10.3	10.1	10.0	9.9	9.8	9.7
	\$m	13.7	13.8	13.9	14.0	14.1	14.3	14.4	14.6	14.8	14.9

Data source: Hi\_Link model.

In Figure 4, pumpkins and capsicums can be seen to suffer losses. This is due to a switching away from these products to other more profitable leviable products.

**Figure 4 - 10% increase in domestic consumption (retail plus food service) (\$m) — by product**

	2007-08	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
	\$m									
<i>Value added — farm income</i>										
Carrots	2.7	2.8	2.8	2.9	3.0	3.0	3.1	3.2	3.3	3.4
Pumpkins	-0.6	-0.6	-0.6	-0.6	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7
Sweet corn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Peas and beans	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Lettuce	8.8	8.7	8.7	8.6	8.5	8.5	8.5	8.4	8.4	8.3
Broccoli	2.0	2.1	2.2	2.2	2.3	2.3	2.4	2.5	2.5	2.6
Cauliflower	0.7	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	1.0
Capsicum nec	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4
Garlic and herbs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Other vegetables	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4
Total	13.7	13.8	13.9	14.0	14.1	14.3	14.4	14.6	14.8	14.9

Data source: Hi\_Link model.

## Appendix E – Export demand

Figure 5 - 10% increase in demand for exports

		2007-08	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
Production – fresh	%	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Production: processing	%	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Prices for fresh sales <sup>b</sup>	%	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Prices for processed sales <sup>b</sup>	%	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Household consumption	%	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Food service	%	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Exports	%	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Farm income	%	1.2	1.3	1.4	1.4	1.4	1.5	1.5	1.5	1.5	1.5
	\$m	1.4	1.6	1.8	1.9	2.0	2.1	2.1	2.2	2.2	2.3

Data source: Hi\_Link model.

Figure 6 reveals that this impact is dominated by carrots.

Figure 6 - 10% increase in demand for exports (\$m) — by product

	2007-08	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
	\$m									
<i>Value added — farm income</i>										
Carrots	1.0	1.1	1.3	1.4	1.5	1.5	1.6	1.6	1.7	1.7
Pumpkins	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweet corn	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Peas and beans	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lettuce	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Broccoli	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cauliflower	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Capsicum nec	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Garlic and herbs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other vegetables	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Total	1.4	1.6	1.8	1.9	2.0	2.1	2.1	2.2	2.2	2.3

Data source: Hi\_Link model.

## Appendix F – Total factor productivity

Figure 7 - 10% increase in on-farm total factor productivity

		2007-08	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
Production: fresh	%	5.7	5.8	5.8	5.9	5.9	5.9	5.9	5.9	5.9	5.9
Production:processing	%	4.5	4.5	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.7
Prices for fresh sales <sup>b</sup>	%	-4.6	-4.6	-4.6	-4.6	-4.5	-4.5	-4.5	-4.5	-4.5	-4.5
Prices for processed sales <sup>b</sup>	%	-5.2	-5.2	-5.2	-5.2	-5.2	-5.2	-5.2	-5.1	-5.1	-5.1
Household consumption	%	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Food service	%	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Exports	%	28.4	27.7	27.2	26.9	26.7	26.6	26.5	26.5	26.5	26.6
Farm income	%	0.1	0.3	0.5	0.6	0.7	0.7	0.8	0.8	0.8	0.8
	\$m	0.1	0.4	0.6	0.8	0.9	1.0	1.1	1.2	1.3	1.3

Data source: Hi\_Link model.

The number impact in Figure 7 masks a range of differing effects by product. Figure 8 breaks down the product specific impacts. Some products gain, while others lose due to higher price declines domestically. Were only positive impacts targeted, the overall impact of a 10% increase would be \$5.15 million by 2018-19.

Figure 8 - 10% increase in total factor productivity on levied vegetables

	2007-08	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
	\$m									
<i>Value added — farm income \$m</i>										
Carrots	0.816	1.005	1.147	1.244	1.326	1.396	1.455	1.504	1.557	1.589
Pumpkins	-0.803	-0.828	-0.854	-0.878	-0.907	-0.937	-0.969	-1.001	-1.034	-1.068
Sweet corn	0.173	0.194	0.206	0.217	0.224	0.231	0.234	0.237	0.240	0.239
Peas and beans	0.198	0.205	0.210	0.216	0.220	0.225	0.229	0.233	0.237	0.241
Lettuce	-1.790	-1.775	-1.756	-1.741	-1.728	-1.716	-1.706	-1.694	-1.686	-1.676
Broccoli	-0.830	-0.846	-0.864	-0.881	-0.900	-0.920	-0.941	-0.961	-0.982	-1.003
Cauliflower	0.014	0.021	0.018	0.013	0.000	-0.014	-0.034	-0.053	-0.074	-0.099
Capsicum nec	0.613	0.623	0.630	0.637	0.645	0.653	0.659	0.666	0.672	0.677
Garlic and herbs	0.525	0.537	0.546	0.555	0.563	0.572	0.579	0.587	0.595	0.602
Other vegetables	1.224	1.289	1.351	1.412	1.475	1.540	1.604	1.669	1.734	1.796
Total	0.141	0.424	0.634	0.794	0.917	1.028	1.111	1.188	1.259	1.297

Data source: Hi\_Link model.



## Appendix G – Mapping of CIE Impact Modelling to Strategic Priorities

	Domestic Development	Export Demand	Transport, Handling, and Productivity	On-Farm Productivity		Sub-Total	Priority Total	Priority Proportion
				Total	Avoided negative			
<b>Consumer Alignment</b>							18.3	54%
▪ Market intelligence	2.5					2.5		
▪ Consumer satisfaction	2.5	3.8				6.3		
▪ Novel products	2.5	3.8				6.3		
▪ Supply chain			3.2			3.2		
<b>Non-Farm Development</b>							7.0	21%
▪ Market intelligence		3.8				3.8		
▪ Industry capabilities								
▪ Supply chain			3.2			3.2		
<b>Farm Production</b>							5.9	17%
▪ Adoption				0.9		0.9		
▪ Robotics				0.9		0.9		
▪ Packaging			3.2			3.2		
▪ Soilless				0.9		0.9		
<b>Farm Inputs</b>							2.6	8%
▪ Climate change					0.51	0.51		
▪ Water					0.51	0.51		
▪ Labour					0.51	0.51		
▪ Agro-chemicals					0.51	0.51		
▪ Biopesticides					0.51	0.51		
<b>Credible Possibility</b>	<b>7.5</b>	<b>11.5</b>	<b>9.6</b>	<b>2.6</b>	<b>2.6</b>	<b>33.8</b>	<b>33.8</b>	<b>100%</b>
Maximum Possibility	14.9	23	19.2	5.2	5.2			

## Appendix H – Qualitative impact assessment

CIS has performed an independent impact assessment based on qualitative industry information to test the reasonableness of the quantitative model performed by CIE. All identified significant challenges and potential RD&E project opportunities were listed within one of the four designated industry priorities. Each industry issue/challenge is provided a rating based on the severity of the impact to the industry’s growth or sustainability. All identified opportunities are given a rating based on the likelihood of levy funds being able to support a successful project within that topic (research risk and adoption risk both considered). Overall priority weightings were then established for each priority category; favouring priorities with high-impact issues and low risk opportunities/solutions (equal weight to each category). As the CIE qualitative impact weightings are aligned with CIE's impact modelling, we concluded that the CIE modelling was reasonable in terms of the proportions of funding and impacts between industry priorities.

	Potential Impact on Industry		Success Risk Rating	Overall Priority Rating
<b>A. Consumer Alignment</b>				
<b>A1. Issues/Challenges</b>		<b>A2. Opportunities</b>		
<b>A1.1</b> Consolidation of retailers, wholesalers, processors, etc.	High	<b>A2.1</b> Exporting vegetable products	Moderate	High
<b>A1.2</b> Vegetables are commodities/lack of ability to differentiate	High	<b>A2.2</b> Marketing on the basis of nutritional value/distinct products	High	
<b>A1.3</b> Consumers Tastes Changing (e.g. Demand for packaged/processed products)	High	<b>A2.3</b> Supply distinct novel products consumers want (e.g. genetically modified crops, gene mapping).	High	
<b>A1.4</b> Stagnant consumption per capita	High	<b>A2.4</b> Supply chain- capacity to provide what retailers/wholesalers/processors need to supply what consumers want	Low	



<b>A1.5</b> Substitution/Cannibalism among vegetable products	Moderate	<b>A2.5</b> Increased technology use to improve cool-storage, packaging, handling, etc.	Low	High
<b>A1.6</b> Increasing Costs of Exporting	High	<b>A2.6</b> Market intelligence/consumer education.	Low	
<b>A1.7</b> Supply driven (lack of price control - increasing yields lowers prices because low export market)	High			
<b>B. Non-farm Development</b>				
<b>B1. Issues/Challenges</b>		<b>B2. Opportunities</b>		
<b>B1.1</b> Cost disadvantages compared to imported products	High	<b>B2.1</b> Co-operatives/Aggregates	Moderate	High
<b>B1.2</b> Lack of standardisation of quality assurance	Low	<b>B2.2</b> Development of supply chain	Low	
<b>B1.3</b> Lack of standardised OH&S standards	Low	<b>B2.3</b> Understanding behavioural impacts on consumer behaviour of food labelling	Low	
<b>B1.4</b> Lack of upholding food labelling standards	Moderate	<b>B2.4</b> Understanding nutritional value of certain growing practices or crop types	Moderate	
<b>B1.5</b> Lack of Processing Capabilities opening doors for imports	Moderate	<b>B2.5</b> Testing imports for use of banned chemicals	High	
<b>B1.6</b> Transport, packaging, processing costs are High Proportion of Marginal Costs	High	<b>B2.6</b> Grower registration (e.g. For Biosecurity & Quality Assurance)	High	
		<b>B2.7</b> More efficient packaging, handling, etc.	Low	
<b>C. Farm Production</b>				
<b>C1. Issues/Challenges</b>		<b>C2. Opportunities</b>		
<b>C1.1</b> Productivity growth in Australia is below global standards	Moderate	<b>C2.1</b> Co-operatives (to increase ability/scale to adopt better practices)	Moderate	Moderate



<b>C1.2</b> Use of enabling technologies for mechanisation is low	Moderate	<b>C2.2</b> Improved yields (e.g. genetically modified crops)	Moderate	
<b>C1.3</b> High capital requirements for mechanisation	Moderate	<b>C2.3</b> Labour saving devices (e.g. mechanisation, robotics)	High	
<b>C1.4</b> Fragmentation-lack of ability/willingness to co-operate	Moderate	<b>C2.4</b> Protected cropping	Low	
		<b>C2.5</b> Soilless Production	High	
<b>D. In-field productivity &amp; resource use</b>				
<b>D1. Issues/Challenges</b>		<b>D2. Opportunities</b>		
<b>D1.1</b> Climate Variability & Sustainability (e.g. heat stress leading to less chilling hours, crop losses from severe weather events, increased risk of pest incursions, etc.)	Moderate	<b>D2.1</b> Protected cropping capabilities	Low	Moderate
<b>D1.2</b> Labour costs	Moderate	<b>D2.2</b> Smart irrigation technologies, other water related mitigation techniques	High	
<b>D1.3</b> Carbon tax - increasing electricity costs	Low	<b>D2.3</b> Genetically modified crops (e.g. climate change, pest/diseases, and increase yields)	Moderate	
<b>D1.4</b> Access to water	Moderate	<b>D2.4</b> Minor use program	Moderate	
<b>D1.5</b> Plant health - Chemical/Pesticide Regulations	Moderate	<b>D2.5</b> Bio-fuels capabilities	High	
		<b>D2.6</b> Carbon tax expense research	High	
		<b>D2.7</b> IPM technologies	Low	



## Appendix I – Stakeholder Consultation List

PARTICIPANT BY STAKEHOLDER GROUP CLASSIFICATION	POSITION/COMPANY
<b>HORTICULTURE AUSTRALIA LIMITED (HAL)</b>	
Warwick Scherf	HAL
David Moore	HAL
Richard Stevens	HAL
Kathyn Lee	HAL
Will Gordon	HAL
John Lloyd	HAL
David Chenu	HAL
<b>AUSVEG</b>	
Romeo Giangregorio	AUSVEG Board Member and Grower
Richard Mulcahy	CEO, AUSVEG
Hugh Tobin	Communications and Public Affairs Manager, AUSVEG
David Addison	AUSVEG Board Member and Grower
John Brent	Chairman, AUSVEG
Geoff Moar	AUSVEG Board Member
Paul Bogdanich	AUSVEG Board Member
Mark Napper	AUSVEG Board Member
Jeff McSpedden	Chairman, VEG IAC
Roger Turner	VEG IAC
Kent West	IAC
Danny De Leso	Grower and IAC Member
Dr Melina Parker	Grower and IAC Member
Andrew White	Manager VIDP Communications, AUSVEG
<b>OTHER INDUSTRY GROUPS</b>	
Mike Redmond	CEO, Grow SA
Jan Davis	CEO, TFGA
Nick Steel	Executive Officer, TFGA
Andrew Craigie	President, TFGA Vegetable Council and Grower
Alex Livingston	CEO, Growcom
Rachel Mackenzie	Chief Advocate, Growcom
Denise Kreymborg	Industry Development Officer
Geoff Chivers	Chairman, Bundaberg Fruit and Vegetable Growers
Peter Peterson	Executive Officer, BFGV
Jim Turley	Executive Officer, VEG WA
Dr Allison Anderson	NSWFA
Malcolm Jones	Carnarvon Growers Association
Margie Milgate	Growcom
Slobodan Vujovic	Vic IDO
Alex Livingston	CEO, Growcom
<b>EXTERNAL INDUSTRY ANALYSTS</b>	
Bren Borell	Managing Director
Derrick Quirke	Director
Tristan Kitchener	AXS Partners Pty Ltd
Chris Monsour	Consultant Agronomist



PARTICIPANT BY STAKEHOLDER GROUP CLASSIFICATION	POSITION/COMPANY
<b>GROWERS</b>	
David De Paoli	Managing Director, AustChilli
Dr Kevin Clayton-Greene	Operations Manager, Harvest Moon
Rodney Emerick	Joint CEO, Mulgowie Farms
Tim Eastwood	Grower
Maric Sumner	Grower
Maureen Dobra	Grower
Damien Rigali	Grower
Ron Bogdanich	Grower
Vincent Tana	Grower
Charlotte Butler	Grower
Rohan Prince	Grower
Maurice Grubisa	Grower
Rob Leishman	Grower
Mario Vorrasi	Grower
Frank Calvaresi	Grower
Peter McFarlane	Grower
Richard Porter	Regional Manager, Peracto
Valerie Bonython	Grower
N. Mecozzi	Grower
Rob Henderson	Grower
Graham McKenna	Grower
Nathan Richardson	Grower
Phillip Loane	Grower
Keeton Miles	Grower
Mike Badcock	Grower
Peter Hardman	Grower
Jeff Yost	Grower
Brian Bonor	Grower
Mike Walker	Plant Physiology Consultant, WV Initiatives Pty Ltd
Ian Young	Grower
Colin Lindsay	Grower
Rob Baylis	Grower
Andrew Happ	Grower
Simon Drum	Grower
Chris McKenna	Grower
Justin Nichols	Grower
Lukas Velisha	Grower
John Nedinis	Grower
Tom Loveless	Grower
James Greig	Grower
Peter Patsuris	Grower
Nick Patsuris	Grower
Nick Kusmanidis	Grower



PARTICIPANT BY STAKEHOLDER GROUP CLASSIFICATION	POSITION/COMPANY
George Marinis	Grower
Nick Marinas	Grower
Con Temuskos	Grower
Gary Muller	Grower
Laurie Land	Grower
Nadine Land	Grower
Ramon Lequerica	Grower
Carl Walker	Grower
Donald & Robyn Sprouk	Grower
Jamie Jurgens	Grower
Vincent Tana	Focus Group
Paul Humble	Focus Group
Peter Ivankovic	Focus Group
Bradley Ipsen	Focus Group
Peter Wauchope	Focus Group
Jim Trandos	Trandos Farms
John Said	Grower & AUSVEG Board
Martin Beattie	Kal Fresh
Michael Nixon	Riverlodge Assets
Richard Bovill	Bovill Farms
Richard Gorman	Kal Fresh
Russell Lamattina	The Lamattina Group
Richard Lamatina	Grower
Joseph Fragapane	Fragapane Farms
Steven Newman	2010 Nuffield Scholar, Nuffield Australia Farming Scholars
Norman Derham	Director, Elstree
Mark Kable	Agricultural Director, Harvest Moon
<b>BUYERS</b>	
Greg Davis	General Manager, Fresh Produce Coles
Darryl Wallace	Coles
Pat McEntee	Woolworths
<b>SELLERS</b>	
David Richards	Market Development Manager, DuPont
John Gilmour	Business Manager, Dow AgroSciences
Andrew Meurant	Horticulture Segment Manager, Elders
Richard Haynes	Key Account Manager, Elders
Richard Dickmann	Head of New Business Development, Bayer
Scott Ward	Portfolio Manager, Bayer CropScience
<b>R&amp;D LEVY SERVICE PROVIDERS</b>	
Professor Phillip Brown	Professor of Horticultural Science, CQU
Ian James	Vegetable Industry Economist
Associate Professor Colin Birch	Vegetable Centre Leader, TIAR
Brent Borrell	CIE
David Heinjus	Rural Directions



PARTICIPANT BY STAKEHOLDER GROUP CLASSIFICATION	POSITION/COMPANY
David Windsor	Director, Irrigated Agriculture Industries Development DAFWA
Dean Akers	DPI QLD
Rodney Wolfenden	DPI QLD
Russell McCrystal	DPI QLD
Dianne Fullelove	Dianne Fullelove & Associates
Dr Frank Hay	UTAS
Ian Macleod	Managing Director, Peracto
Lauren Thompson	Scholefield Robinson Horticulture Services
Lu Hogan	Rural Directions
Martin Kneebone	Director, Fresh Logic
Michael Kennedy	DEEDI
Nick Macleod	DEEDI
Peter Dal Santo	Director, AgAware Consulting
Sean Richardson	Syngenta
Steve Spencer	Director, Fresh Logic
Anne-Maree Boland	RMCG
Euan Laird	Director, Farm Services Victoria DPI
Jim Geltch	CEO, Nuffield Australia Farming Scholars
David Brownhill	Australian Chairman, Nuffield Australia Farming Scholars
<b>GOVERNMENT</b>	
Dr Ian Porter	Principle Research Scientist, VIC DPI
Barbara Hall	Plan Pathologist, SARDI
Len Tesoriero	Industry Leader, NSW DPI
<b>ADVISORY WORKING GROUP MEMBERS</b>	
David Cox	
Luke Harris	
Richard Harslett	
Andreas Klieber	
Michael Le	
Jan Vydra	
Alison Anderson	Senior Policy Advisor, NSW Farmers Association
Joe Elbustani	
Stuart Smith	
Dijana Jevremov	
Brett Whelan	
Lisa Crooks	
Maureen Dobra	
Phillip Loane	
Pater Ward	
Jeff Yost	Business Development Manager, Simplot Australia
Andrew Bulmer	
Bard McPherson	
Kathy Sims	
John Shannon	Policy and Program Manager, VegetablesWA



PARTICIPANT BY STAKEHOLDER GROUP CLASSIFICATION	POSITION/COMPANY
Andrew Craigie	Vegetable Council Chairperson, TFGA
David Ellement	
Jason Huggins	
Steve Newman	
David Wallace	
David Carey	
Doug Clark	
Phillip Frost	
Kevin Bodnaruk	
Peter Cochrane	
Dale Griffin	
Alan Norden	
Sonya Broughton	
Peter Deuter	
Ben Callaghan	
Eddie Galea	
Paul Horne	
Sandra McDougall	
Nancy Schellhorn	
David Anderson	
Mark Clements	
Martin Wilson	
Richard Bennett	
Anthony Brandesema	
Godfrey Dol	
Chris Millis	
Graeme Smith	
Marrco Montagna	
Denise Ellement	
Peter Ward	IAC Member

