Mushroom

STRATEGIC INVESTMENT PLAN

2017-2021

Hort Innovation
Strategic levy investment

MUSHROOM FUND

Content

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Introduction

This Strategic Investment Plan (SIP) is the roadmap that helps guide Hort Innovation's oversight and management of individual levy industry investment programs. The SIP lays the foundation for decision making in levy investments and represents the balanced interest of the particular industry from which the levy is collected. The very important function of the SIP is to make sure that levy investment decisions align with industry priorities.

Hort Innovation is the not-for-profit, grower-owned research and development (R&D) and marketing company for Australia's $9 billion horticulture Industry.

As part of the role Hort Innovation acts as the industry services body for Australian horticulture, the organisation is tasked by the Australian Government with working alongside industry to produce a strategic plan for investment of levies in industry R&D and marketing activities.

Each individual levy industry investment strategy also speaks to the future growth and sustainability of the Australian horticulture industry, as a whole. The SIPs are produced under the umbrella of the Hort Innovation Strategic Plan, which takes a whole of industry view in setting its direction, as it considers broader agriculture government priorities for the advancement of Australian horticulture.

The process in preparing each SIP was managed by Hort Innovation and facilitated in partnership with Industry Representative Bodies and Strategic Investment Advisory Panels (SIAP). Independent consultants were engaged to run the consultation process, to gather the advice from stakeholders impartially and produce a plan against which each levy paying industry can be confident of its strategic intent.

Hort Innovation has valued the support, advice, time and commitment of all stakeholders that contributed to producing the SIPs, especially mushroom growers.

The mushroom SIP

Producers in the mushroom industry pay levies to the Department of Agriculture and Water Resources (DAWR), who is responsible for the collection, administration and disbursement of levies and charges on behalf of Australian agricultural industries.

Agricultural levies and charges are imposed on primary producers by government at the request of industry to collectively fund R&D, marketing, biosecurity and residue testing programs.

The mushroom levy is only applied to Agaricus mushrooms. It is calculated on a dollar per kilogram of mushroom spawn basis.

The current rate is $4.32 per kilogram of mushroom spawn. 'Mushroom spawn' is *Agaricus spp mycelia* contained in a medium and used for the inoculation of phase 2 substrate, including – but not limited to – grain spawn, casing inoculum and inoculated supplement.

Hort Innovation manages the mushroom levy funds. Levy funds are spent on R&D (20 per cent) and industry marketing (80 per cent) activities.

Hort Innovation has developed this SIP for the mushroom industry to strategically invest the collected mushroom levy funds into the priority areas identified and agreed by the mushroom industry. The ability to deliver on all the articulated strategies (and investments) in an impactful manner will be determined by the ability of the statutory levy to provide the resources to do so.

This plan represents the Australian mushroom industry's collective view of its R&D and marketing needs over the next five years (2017 to 2021). This plan has been developed in consultation with Australian mushroom levy payers through a synthesis of various processes including:

- Consultation with key stakeholders and member of the SIAP
- Regular presentations to the mushroom SIAP and seeking their counsel on the processes
- An industry-wide online survey
- A one-day SIP investment and strategy priority-setting workshop
- Public consultation on the draft SIP.

The process to develop this plan is fully described in ***Appendix 1***. The people consulted in the preparation of the plan are listed in ***Appendix 1*** and the documents referred to are listed in ***Appendix 3***. The mushroom SIAP has responsibility for overseeing the industry's strategic investment plan and providing strategic investment advice to Hort Innovation. The panel will be guided by the strategic investment priorities identified within this plan. For more information on the mushroom industry SIAP constituency please visit Hort Innovation's website at www.horticulture.com.au.

Mushroom

STRATEGIC INVESTMENT PLAN 2017-2021 AT A GLANCE

POTENTIAL IMPACT OF THIS PLAN

$104 Million

Based on an estimated investment of $26.9 million over the next five years

OUTCOMES	STRATEGIES
Achieve the bold and ambitious target of domestic consumption of 4 kilograms per person per year of mushrooms by 2021	Annual development of a mushroom marketing program
	Monitor actual consumption per capita and trends against annual targets
	Develop and implement a food service marketing and promotion program
	Diversification through the identification and establishment of new markets
	Review previous investment into health professionals to promote the consumption of mushroom as a healthy alternative to evaluate its effectiveness and guide future investments in this area
	Use Industry intelligence to evaluate and monitor the effectiveness of the marketing and promotions (M&P) program with the intent to continually increase demand

OUTCOMES	STRATEGIES
Mushroom growers are profitable and sustainable through increased yields, reduced costs and effective risk management	Improve production by increasing yield and quality
	Undertake research and development to enhance industry risk management and supply contingencies
	Sharing dedicated knowledge, efficient innovation and research capacity

Major opportunities

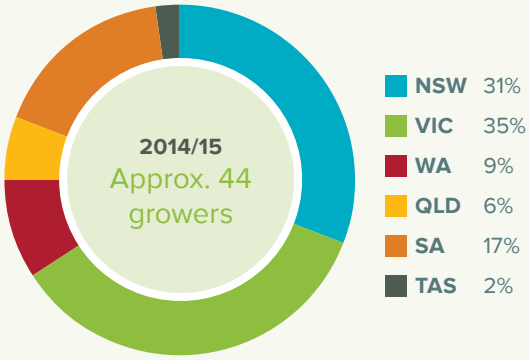
- Increasing demand by ensuring mushrooms are front of mind with the consumer
- Building presence in the value adding sector and making product more available to caterers of large functions
- Export marketing opportunities
- Targeted and effective marketing and promotion program to continually increase consumption of mushrooms
- Boost mushroom consumption in summer
- Grow demand for fresh loose/bulk mushrooms
- Food service marketing and promotion program
- Better dissemination of information to industry
- Creation of Centre of Excellence providing cross-sector research for composting.

Mushroom
STRATEGIC INVESTMENT PLAN 2017-2021
AT A GLANCE

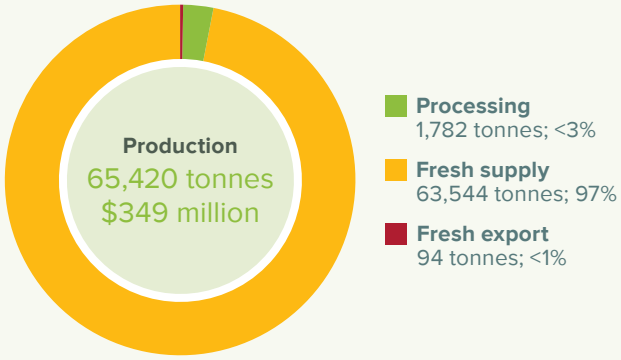
Major challenges

- Rising water, labour and power costs above CPI
- A major food scare related to mushrooms for example listeria
- Ineffective marketing and promotion programs especially in summer
- Increased disease potential
- Farms increasing capacity ahead of demand
- Lower prices
- Poor impression of horticultural industry as not paying well making it difficult to attract and retain good staff resulting in loss of industry knowledge
- Continuation of farm closures
- Reduced access to chemicals
- Reduced profitability
- Ageing industry (farms, growers, researchers, consultants, auditors, accreditation)
- Lack of up-to-date data on market segmentation restricts the ability of the industry to gain insights on how to expand in all available sales channels
- Exposure to high labour costs.
- Mature market with minimal growth
- Difficult for smaller farms to compete
- Australia's retail landscape is dominated by three major retailers
- The Australian mushroom industry has not been able to improve farm gate prices relative to CPI
- High cost and small market
- Communicating the recent changes across all growers over the last six to 12 months
- Lack of scientific understanding of the growing process
- Lack of export cold chain combined with high labour costs means that Australian mushrooms are not competitive overseas
- Industry's understanding of the role of the SIAP
- Competition from other food products particularly in the summer months
- Trends towards pre-pack bringing down the average buying size of mushroom
- Australia has a high cost of production for mushroom production.

Industry size and production distribution



Mushroom supply chain and value 2014/15



SECTION ONE

Context

The Australian mushroom industry

The Australian mushroom industry's future prosperity and direction is underpinned by the quality of its industry strategy. This strategy provides the platform for growth.

Industry overview

The industry has undergone some rationalisation in recent years with the number of commercial growers reducing from 73 in 2011 to the current 44[1]. In 2014/15 the industry produced 65,402 tonnes of mushrooms[2]. The value of production in 2014/15 was $349 million while the wholesale value of fresh supply was $420.5 million[3].

Mushroom production occurs in most states and close to the population centres, in particular the Sydney Basin, metropolitan Melbourne and Adelaide.

Mushrooms are unique within the Australian agriculture and horticultural industries as they are neither plant nor animal. Mushrooms are nutritious, high in dietary fibre and protein, contain many important vitamins and minerals and provide health benefits to consumers. Unlike plants, mushrooms do not photosynthesise and they derive their nutrition from organic material. They are produced year-round and grown under cover in strictly controlled environments.

The domestic mushroom industry cultivates a range of edible mushrooms for human consumption, including *Agaricus bisporus* (button, cup, flat and brown mushroom) as well as exotic mushroom varieties including shiimeji and oyster.

The markets

Almost 97 per cent of mushrooms produced locally are consumed in the fresh market[4] with less than one per cent of fresh production exported. There are limited export market opportunities as a result of the high cost of production in Australia. Prepacked and value-added mushrooms, such as sliced, are growing market segments. Currently less than three per cent of fresh production mushrooms are used in processing.

The consumer

While mushrooms have not historically been a large part of the traditional "meat and three vegetable" approach, 83 per cent of Australian households now purchase mushrooms[5]. Australia now has one of the higher consumptions per capita of mushrooms of countries with developed economies.

The average Australian consumption of mushrooms per capita is 2.8 kilograms per person[6]. The consumption of mushrooms per capita in Canada, a similar market, is 3.5 kilograms per person[7]. Asian countries, in contrast, historically record much higher consumption. Asian consumers are much more aware of the health and savoury benefits of mushrooms. China's consumption of mushrooms per capita is around 10 kilograms per person[8]. There is room for improved consumption.

Almost 97 per cent of mushrooms produced locally are consumed in the fresh market...

1 Australian Mushroom Growers Association (AMGA)
2 *Australian Horticulture Statistics Handbook 2014/15*
3 *Australian Horticulture Statistics Handbook 2014/15*
4 ibid
5 AMGA
6 *Australian Horticulture Statistics Handbook 2014/15*
7 AMGA
8 AMGA

The mushroom industry commissioned a report that was managed through Hort Innovation, *Driving mushroom growth: Opportunity and positioning workshop* (MU15000), through its levy investment in 2015 to achieve:

- Deep understanding of the mushroom consumer and market in order to identify key targets and growth opportunities
- Development of a compelling position to add genuine value and underpin marketing communication and innovation.

The research identified two types of mushroom consumers based on attitudes to food and to cooking – heavy mushroom users and medium mushroom users.

Heavy mushroom users:

- Confident and adventurous cooks
- Represent 26 per cent of consumers but 41 per cent of the volume of mushrooms consumed
- Have 'go to' meals that they cook regularly but they also like to also experiment with new dishes
- Like to mix up ingredients and rarely follows recipes
- Love and appreciate the unique taste of mushrooms and value the versatility of them
- Think of mushrooms as healthy but most are unaware of the specific health benefits
- Throw mushrooms into all types of meals
- Use mushrooms as both the hero of the dish and as a meal filler
- Hide mushrooms in meals if their children do not like them
- Routinely buy mushrooms regardless of price – they nearly always have mushrooms in their fridge
- On average they will purchase mushrooms six times a month.

The key marketing challenge – how do we get heavy mushroom users to appreciate the benefits of incorporating more mushrooms in each dish?

Medium mushroom users:

- Less confident cooks who tend to stick to meals they know or follow the recipes closely
- They represent 54 per cent of consumers and 56 per cent of the volume of mushrooms consumed
- Stick to using a few basic ingredients and rarely experiment with new meals or ingredients
- Enjoy the mushroom taste but only associate mushrooms with a limited number of specific meals
- Think of mushrooms as healthy but most are unaware of the specific health benefits
- Use mushrooms for specific meals only, often when following a recipe
- Mushrooms are usually the hero of the dish rather than an added filler
- Avoid using them in children's meals if the child doesn't like the taste
- Only buy mushrooms for a specific meal, not as part of their staple shopping list
- On average this group will purchase mushrooms three times a month.

The key marketing challenge – how do you give medium mushroom users the confidence to use mushrooms in a wide variety of everyday meals?

Supply and demand

Oversupply is a major issue for the industry with supply exceeding demand for five months of the year, causing price cuts and impacting profitability of some enterprises. Consumption of mushrooms also declines over summer and the question of how levy funded marketing activities could better address this issue needs to be examined in more detail. This may include gathering and analysing data for consumer insights that would lay the platform for future marketing and promotion activities to increase summer consumption.

The industry does not currently have effective industry intelligence to quantify production volumes. Effective industry intelligence would assist in the evaluation and monitoring of marketing and promotion initiatives aimed at increasing demand for mushrooms when additional supply occurs.

The industry is focused on addressing this issue. It is essential that the industry continue to undertake regular consumer and market research to gain insights that will enhance future marketing and promotion activities.

Established industry risk management systems

Food safety is a significant focus. Growers and the industry understand the impact a food scare would have on the demand and reputation of mushrooms. AmSafe, the industry's risk management program around potential food safety issues, is highly regarded within the industry and considered a vital part of the industry's risk management strategy.

Pest and disease management is a major production focus. The industry is constantly seeking better management options and ways of monitoring diseases. Investment in training to ensure best management practices are being used with the application of chemicals remains a priority. Ongoing access to current chemical solutions is important as is the ongoing quest to discover cost-effective alternatives.

The industry is faced with rising costs in labour, energy and general inputs. Australia's variable climatic conditions, especially droughts, can impact on input costs of composting. Finding sustainable and cost effective alternatives will assist the industry greatly while further research into production improvement, marketing and innovation will enable the industry to better capture opportunities and help create a more sustainable and profitable industry.

Human capital

Continuing to attract great talent and introducing succession planning for smooth transitions are emerging issues for the industry. Clearly, any improvement in industry profitability will assist with both challenges. Importantly, there is not currently any specific course on mushroom production so the relevant skills, knowledge and systems must be learned on the job, presenting a particular challenge.

The industry is faced with rising costs in labour, energy and general inputs.

The mushroom levy

The mushroom levy is only applied to Agaricus mushrooms. It is calculated on a dollar per kilogram of mushroom spawn basis. The current rate is $4.32 per kilogram of mushroom spawn. 'Mushroom spawn' is *Agaricus spp mycelia* contained in a medium and used for the inoculation of phase 2 substrate, including—but not limited to—grain spawn, casing inoculum and inoculated supplement.

The total mushroom statutory levy (marketing and R&D) collected from growers over the last four years was:

Year	Total levy collected
2012/13	$2,716,452
2013/14	$2,476,956
2014/15[9]	$4,296,349
2015/16	$4,819,417

The industry invests 80 per cent of the mushroom levy into marketing activities. The remaining 20 per cent is invested into R&D and attracts contributions by the Australian Government. Three existing R&D projects are funded as part of the mushroom SIP 2017-2021. Two of these are communication projects and one is an industry risk management project. All these projects will have been completed by the end of 2018/19. The project commitments for 2017/18 and 2018/19 are $433,326 and $265,456 respectively.

9 the higher levy collection was due to an increase in the levy fee

Operating environment

The mushroom industry	
Strengths	• Unity – it is a close knit industry that works together to achieve beneficial outcomes for the whole industry • The predictable and consistent supply of mushrooms • Australia is seen as a producer of clean and green products • Mushrooms are a great, healthy, clean product for consumption and available all year round • The Peak Industry Body (PIB), Australian Mushroom Growers' Association (AMGA), is strong and professional • High entry cost, technical industry • Collaboration and clear vision • Minimal fresh imports or international competition • Hort Innovation structure supported by an effective SIAP • The industry's marketing and promotions program.
Weaknesses	• Lack of up-to-date data on market segmentation restricts the ability of the industry to gain insights on how to expand in all available sales channels • Exposure to high labour costs • Mature market with minimal growth • Difficult for smaller farms to compete • Australia's retail landscape is dominated by three major retailers • The Australian mushroom industry has not been able to improve farm gate prices relative to CPI • High cost and small market • Communicating the recent changes across all growers over the last six to 12 months • Lack of scientific understanding of the growing process • Lack of export cold chain combined with high labour costs means that Australian mushrooms are not competitive overseas • Industry's understanding of the role of the SIAP • Competition from other food products particularly in the summer months • Trends towards pre-pack bringing down the average buying size of mushroom • Australia has a high cost of production for mushroom production.
Opportunities	• Increasing demand by ensuring mushrooms are front of mind with the consumer • Building a presence in the value adding sector and making product more available to caterers of large functions • Export marketing opportunities • Targeted and effective marketing and promotion program to continually increase consumption of mushrooms • Boost mushroom consumption in summer • Grow demand for fresh loose/bulk mushrooms • Food service marketing and promotion program • Better dissemination of information to industry • Creation of Centre of Excellence providing cross-sector research.

The mushroom industry	
Threats	• Rising water, labour and power costs above CPI • A potential major food scare related to mushrooms such as listeria • Ineffective marketing and promotion programs especially in summer • Increased disease potential • Farms increasing capacity ahead of demand • Lower prices • Poor impression of horticultural industry as not paying well making it difficult to attract and retain good staff resulting in loss of industry knowledge • Continuation of farm closures • Reduced access to chemicals • Reduced profitability • Ageing industry (farms, growers, researchers, consultants, auditors, accreditation).

2

SECTION TWO

Mushroom industry outcomes

Industry outcomes

OUTCOME 1

Achieve the bold and ambitious target of domestic consumption of 4 kilograms per person of mushrooms by 2021

Almost 97 per cent of mushrooms produced locally are consumed within Australia. Australia is the highest cost producer of mushrooms globally and exports account for less than one per cent of fresh production. The high cost of airfreight and the highly perishable nature of mushrooms limit export opportunities.

The growth and sustainability of the mushroom industry is reliant on increasing consumption. Currently, mushroom consumption per capita is 2.8 kilograms per person. In Canada and China the mushroom consumption per capita is 3.5 kilograms per person and 10.0 kilograms per person respectively. If Australia could raise consumption per capita to 4 kilograms per person, the result would be extra demand of over 550,000 kilograms per week. This is based on the Australian population being 24 million people. The Australian Bureau of Statistics (ABS) reported in November 2013 that the Australian population would be 30.5 million in 2031 (an increase of 7.8 million persons or 1.56 per cent per annum). This will also increase demand for mushrooms.

Currently, the demand for mushrooms declines over the summer months. This is due to greater competition for the consumer dollar from summer fruits. Summer fruit production has expanded into new regions and with new varieties, resulting in an extension in the period summer fruit is available to consumers. The industry has not traditionally targeted levy funded marketing activities over this period. There is a need for further investigation into the effectiveness of doing so to increase summer consumption of mushrooms.

As the industry grows, extra production will enter the market. Ideally, marketing activities would create extra demand to accommodate for this additional supply. Oversupply has a negative impact on industry profitability. Currently, industry intelligence has not developed sufficiently to allow for levy-funded marketing activities targeting specific periods when extra supply is entering the market. As the industry continues to develop, there is greater need to better match supply with marketing activities that will increase the demand for mushrooms.

The industry has decided to implement improved collation of industry production volumes. Hort Innovation will undertake this process with the metadata only to be used to provide better insight into how and when marketing activities may be required to promote demand for mushrooms. This will assist in better monitoring and evaluation of the effectiveness of levy-funded marketing activities as well as the development and implementation of tactical marketing strategies as required.

The industry is also looking to better understand and support the food service sector. This will require research into the sector's requirements, its distribution and sales channels and how to best position and market mushrooms to drive extra demand and consumption within this segment. An appropriate marketing and promotion program can then be developed and implemented.

Other opportunities may exist to increase mushroom consumption through diversification and export. It is important that research is undertaken to fully understand these opportunities both in terms of customer requirements and commercial viability.

Increasing consumption per capita along with the increasing Australian population will create the demand required to enable the industry to grow.

OUTCOME 2

Mushroom growers are profitable and sustainable through increased yields, reduced costs and effective risk management

The industry faces a number of risks including, but not limited to supply exceeding demand, loss of access to chemicals and/or methods to control pest and disease, lack of productivity gains and the food safety risks. The industry understands these risks and has an established risk management strategy in place to deals with any potential food safety or crisis management issue. This needs to be maintained as it protects the reputation of mushrooms as a healthy food sources and keeps the industry sustainable.

Sustainability is viewed in a holistic context. This means that efforts need to focus not just on the environmental aspect of sustainability but also the economic, consumer demand, human capital and production input aspects of the industry. Consumer demand is addressed through the industry's marketing activities and market research to identify and target new opportunities to increase demand for mushrooms.

Pest and disease management is a constant challenge for the mushroom industry. The industry is constantly scanning globally to understand emerging diseases. Pest and disease management strategies are continually discussed and reviewed within the industry and the correct and appropriate use of chemicals is an area of focus. While the industry continues to explore cost effective alternatives, maintaining access to chemicals is important. For chemical companies, the Australian market is considered small and the industry is cognisant of the importance of ensuring there is ongoing access to appropriate chemicals and that they are used in compliance with the manufacturers' or Minor Use Permit directives.

Improving yield is a key area to help keep the industry profitable and sustainable. Further research into composting and how to better use nutrition to enhance yield is required.

Sustainability in the supply of inputs is important. Australia's variable climate, particularly in drought years, can cause issues with regards to the supply and cost of some inputs, for example, hay. Finding cost effective alternatives to inputs will assist greatly in improving the profitability and sustainability of the mushroom industry.

Quality management is also essential. The industry is focused on ensuring all growers understand the importance of having effective quality management systems. Some parts of the industry are moving to integrated risk management plans which not only incorporates their quality management system but other areas, for example, workplace health and safety (WH&S).

The industry is focused on ensuring all growers understand the importance of having effective quality management systems.

SECTION THREE

3 Mushroom industry priorities

Industry investment priorities

The ability to deliver on all the articulated strategies (and investments) in an impactful manner will be determined by the ability of the statutory levy to provide the resources to do so.

OUTCOME 1 – Achieve the bold and ambitious target of domestic consumption of 4 kilograms per person of mushrooms by 2021	
STRATEGIES	**POSSIBLE DELIVERABLES**
Annual development of a mushroom marketing program	• The deliverables are the activities in the marketing plan
Monitor actual consumption per capita and trends against annual targets	• Data collection and analysis on mushroom consumption providing insights and recommendations
Develop and implement a food service marketing and promotion program	• Research to understand the food service sector. This includes a side-to-side understanding of the market segment, their requirements, marketing channels and opportunities for mushrooms • Development of a marketing and promotion program based on size of the opportunity identified
Diversification through the identification and establishment of new markets	• Understanding of new market opportunities, including their requirements and supply channels
Review previous investment in to health professionals to promote the consumption of mushroom as a healthy alternative to evaluate its effectiveness and guide future investments in this area	• Research and development to determine the cost: benefit analysis on investment into health professional to increase demand
Use Industry intelligence to evaluate and monitor the effectiveness of the M&P program with the intent to continually increase demand	• Develop an effective volume of production forecasting system • Understanding of the effectiveness of the industry's marketing and promotion program including: » Data supporting key market actuation timings, including who is buying and when, demographic profile and how to retain c onsumers » An understanding and dynamic approach to how the industry will react to changing market conditions

OUTCOME 2 – Mushroom growers are profitable and sustainable through increased yields, reduced costs and effective risk management	
STRATEGIES	**POSSIBLE DELIVERABLES**
Improve production by increasing yield and quality	• Research into inputs compost and improved production techniques that improve quality and cost effectiveness • Maintain access to chemicals and/or have cost effective alternatives to manage pest and diseases
Undertake research and development to enhance industry risk management and supply contingencies	• Integrated risk management plans implemented in industry such as food safety, workplace relations, WH&S, chemical usage • Supply contingencies that provide alternatives for compost sources, raw material supplies, chemicals and pest and disease management options
Sharing dedicated knowledge, efficient innovation and research capacity	• Dedicated Centre of Excellence for industry's knowledge and innovation • Regular communication with levy payers regarding levy funded activities and outcomes

Aligning to Hort Innovation investment priorities

In establishing investment priorities, Hort Innovation analysed both historical and current levy and co-investment portfolios and priorities. From this analysis, we identified 11 cross-sectoral investment themes. We consolidated these themes further and considered their alignment with the Australian Government's Rural RD&E Priorities and National Science and Research Priorities, to arrive at five investment priorities outlined in ***Figure 1***. ***Figure 1*** also shows how each cross-sectoral investment theme relates to the five investment priorities.

Figure 1: Hort Innovation's investment priorities

The alignment of the mushroom SIP outcomes to the Hort Innovation investment priorities, and consequently, the Australian Government's Rural RD&E Priorities and National Science and Research Priorities is shown in ***Table 1***.

Table 1: Alignment of mushroom SIP outcomes to the Hort Innovation investment priorities

Hort Innovation investment priorities	Mushroom SIP outcomes
Support industry efficiency and sustainability	Mushroom growers are profitable and sustainable through increased yields, reduced costs and effective risk management
Improve productivity of the supply chain	
Grow the horticulture value chain capacity	
Drive long-term domestic and export growth	Achieve the bold and ambitious target of domestic consumption of 4 kilograms of mushrooms per person by 2021
Lead strategically to enhance the development of the Australian horticulture industry through operational excellence	Enabler Annual review of SIP

4

SECTION FOUR

Mushroom industry monitoring and evaluation

Mushroom SIP monitoring, evaluation and reporting

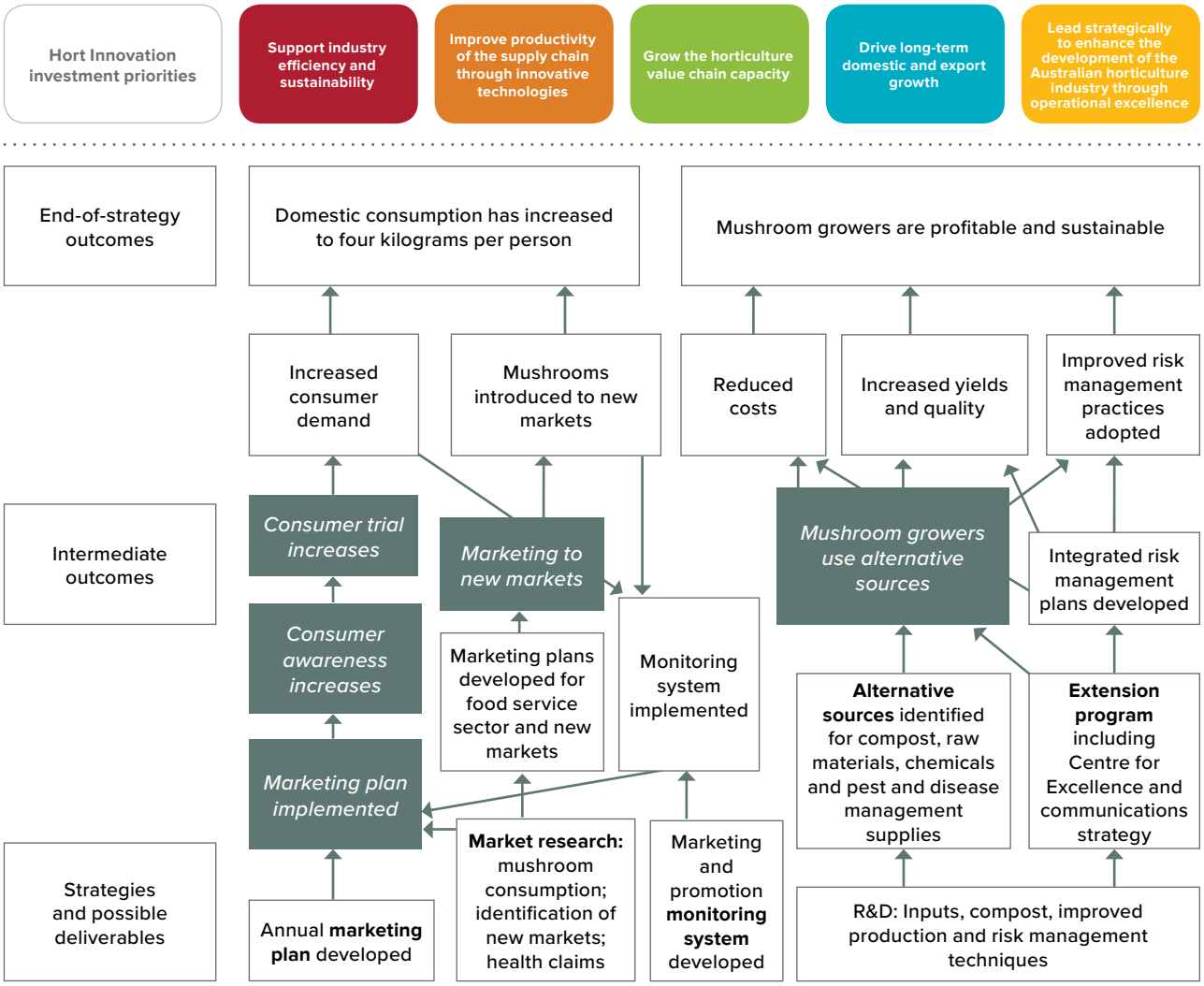
A SIP program logic and monitoring and evaluation (M&E) plan has been developed for the mushroom SIP. The Hort Innovation Organisational Evaluation Framework informs this plan. The logic maps a series of expected consequences of SIP investment. The M&E plan shows the performance measures that will be measured to demonstrate progress against the SIP and what data will be collected. Progress against the SIP will be reported in Hort Innovation publications and at industry SIAP meetings.

The SIP outcomes and strategies will be used to inform investments in individual projects to deliver on the SIP. The results of M&E will be used to reflect on the results of investments and in decision-making. Hort Innovation will facilitate the regular review of SIPs to ensure they remain relevant to industry.

Mushroom SIP logic

An indicative mushroom SIP program logic is shown in ***Figure 2***. The logic is based on the Hort Innovation SIP logic hierarchy (***Appendix 2***). The shaded boxes are not fully explicit in the SIP but necessary conditions for the achievement of expected outcomes.

Figure 2: Mushroom SIP logic



Mushroom SIP M&E plan

The mushroom M&E plan is shown in ***Table 2***. The table includes key performance indicators (KPIs) and data collection methods both at a macro/industry (trend) level and at more specific SIP level/s.

Table 2: Monitoring and evaluation plan for the mushroom SIP

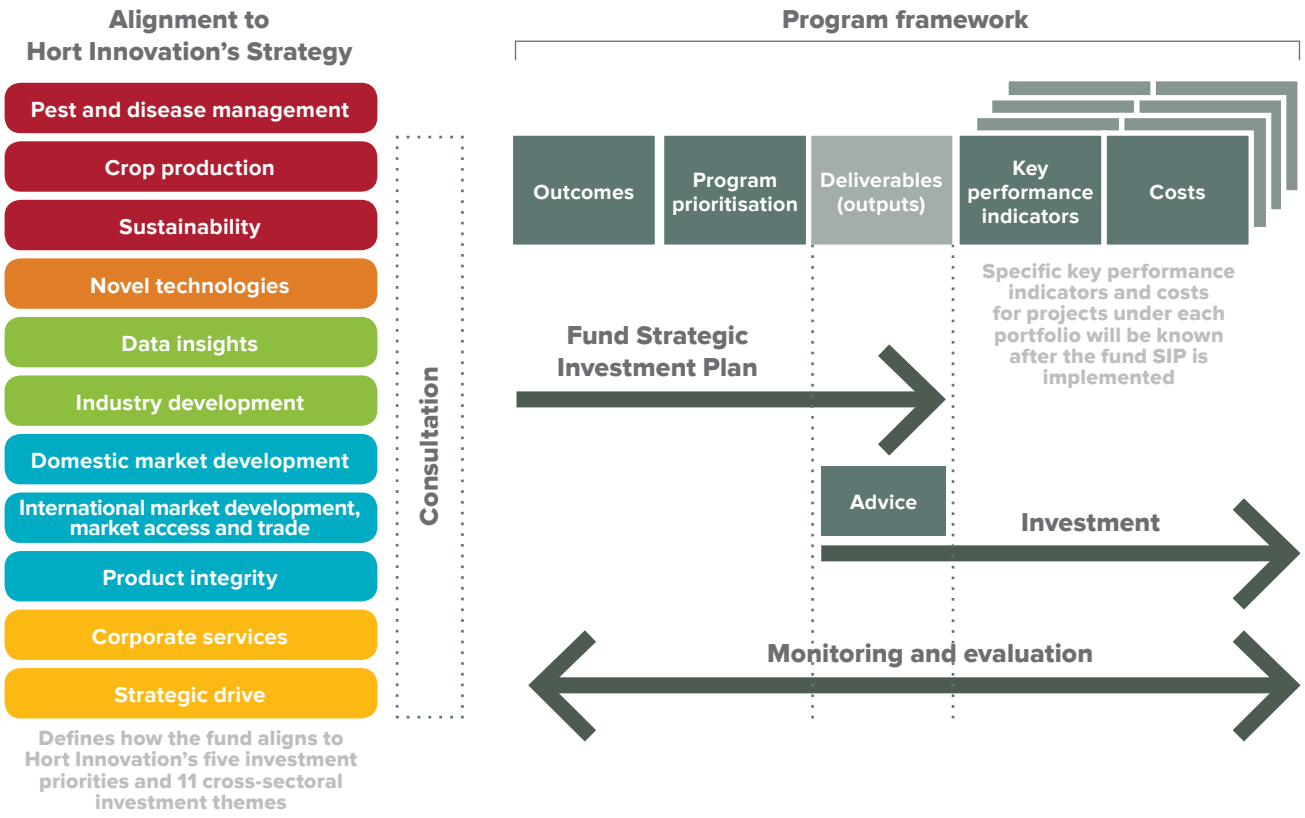
Outcome	Strategies	KPIs	Data collection methods and sources
Achieve the bold and ambitious target of domestic consumption of 4 kilograms per person of mushrooms by 2021	Development of a mushroom annual marketing plan Monitor actual consumption per capita and trends against annual targets Develop and implement a food service marketing and promotion program Diversification through the identification and establishment of new markets Review previous investment in to health professionals to promote the consumption of mushroom as a healthy alternative to evaluate its effectiveness and guide future investments in this area Use Industry intelligence to evaluate and monitor the effectiveness of the M&P program with the intent to continually increase demand	• Mushroom category growth of 8.5 per cent or better per annum • Effective M&P program targeting food service showing annual increase in the supply of mushrooms to this market • Investment data on the effectiveness of investment into health professional to increase demand • Annual review of M&P program, its underlying strategy and the development and actioning of recommendations where required • 90 per cent of growers by volume providing production numbers	• Statistics (ABS) • Retail/consumer behaviour and attitudinal data • Market research reports • Research report(s) • SIAP minutes • Grower data • AMGA/AmSafe
Mushroom growers are profitable and sustainable through increased yields, reduced costs and effective risk management	Improve production by increasing yield and quality Undertake research and development to enhance industry risk management and supply contingencies	• Research projects identification of yield productivity increases • 100 per cent of potential industry crisis dealt with effectively – AMGA • A program, has been developed and executed to ensure growers are aware of quality management systems • Industry has access to the same level of chemicals, or a viable equivalent • 80 per cent of growers feeling well informed on levy funded marketing and R&D outcomes and activities	• Grower survey • Minor use permits requests • AmSafe • AMGA • Research reports

Reporting

The program framework in ***Figure 3*** is the mechanism that links Hort Innovation's strategy and investment priorities to the investment process through the industry SIP. SIPs assist Hort Innovation to prioritise and implement the specific industry R&D, extension and marketing programs.

Hort Innovation will use dynamic reporting against our monitoring and evaluation framework to report on investment progress. The contribution of investments to each industry outcome will be reported regularly, including through industry Annual Reports, Hort Innovation's Annual Report and Hort Innovation's Annual Operating Plan.

Figure 3: Hort Innovation's program framework



SECTION FIVE

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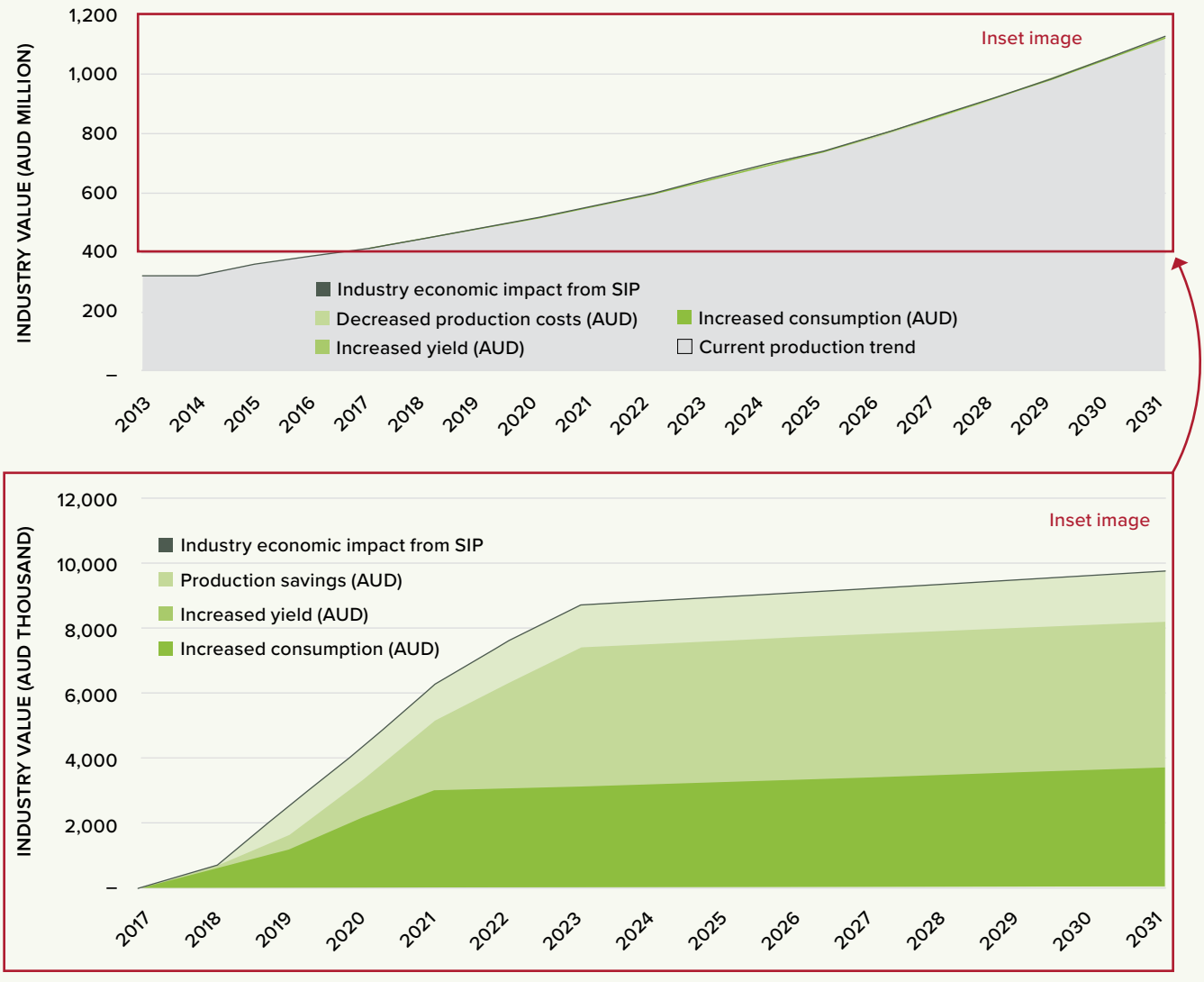
Impact assessment

Figure 4: Economic benefit from investment in the mushroom SIP



An independent assessment of the potential economic impacts from investment into the mushroom SIP indicated a positive return on investment for the industry (***Figure 4***). The anticipated investment of $26.9 million over the next five years in R&D, extension and marketing activities is expected to generate $104.1 million in net benefits for the industry, representing a benefit cost ratio of 3.87 times to growers and service providers along the value chain.

The assessment draws from a wide range of available data sources, and projects economic impacts over a 15-year period starting from 2016/2017. A five per cent discount rate has been applied and all values are adjusted for inflation and presented in 2016/2017 dollar terms. The assessment takes a highly conservative approach and the presented figures have been adjusted to account for risks associated with achieving research outputs, expected adoption and impacts.

Table 3 provides a summary of the assessed impacts for each outcome identified in the SIP, the anticipated deliverables, net economic benefits and benefit cost ratio.

Table 3: Summary of assessed impacts for each SIP outcome

Outcome	Expected deliverables	Anticipated SIP investment (over five years)	Net benefits (over 15 years)	Benefit cost ratio
OUTCOME 1: Achieve the bold and ambitious target of domestic consumption of 4 kilograms per person of mushrooms by 2021	An annual mushroom marketing plan; data analysis on mushroom consumption; research to understand the food service sector; development of a marketing and promotion program; understanding new market opportunities; develop an effective model of production forecasting	$8,062,789	$40,341,372	5.00
OUTCOME 2: Mushroom growers are profitable and sustainable through increased yields, reduced costs and effective risk	Research into inputs such as compost and improved production techniques that improve quality and cost effectiveness; maintain access to chemicals and/or have cost effective alternatives to manage pest and diseases. Centre of Excellence for industry's knowledge and innovation; and regular communication with levy payers regarding levy funded activities and outcomes	$9,406,587	$46,932,178	4.99
OUTCOME 2: Mushroom growers are profitable and sustainable through increased yields, reduced costs and effective risk	Integrated risk management plans in industry; supply contingencies that provide alternatives for compost sources, raw material supplies, chemicals and pest and disease management options. Centre of Excellence for industry's knowledge and innovation; and regular communication with levy payers regarding levy funded activities and outcomes	$9,406,587	$16,831,465	1.79
All impacts		**$26,875,964**	**$104,105,015**	**3.87**

The quantified impacts associated with Outcome 1:

- Increased consumption per capita, supporting increased production to match demand. This will be driven largely by marketing activities to identify new markets, particularly in the food services sector
- The increased production volume will result in increased production and wholesale value.

The quantified impacts associated with Outcome 2 include:

- An increase in yield due to enhanced quality processes and better management of pests and diseases
- A decrease in direct costs of production due to supply contingencies that provide alternatives for compost sources, raw material supplies and chemicals
- Training and extension activities contribute towards both of the above benefits.

6

SECTION SIX

Risk management

The purpose of this risk section is to highlight any unique or specific risks that qualify the SIP. This is not intended to be an exhaustive risk review of the industry risks, which in part are considered in the SWOT. This is also not reflective of the general investment risks which will be considered in the project investment process.

The risks associated with achieving the outcomes of this SIP are:

- The industry does not achieve support for the provision of production data and hence the forecasting system fails to achieve its objective
- Research fails to identify any techniques to improve profitability and/or cost effective alternatives for inputs
- An exotic disease incursion occurs and impacts on mushroom production, profitability and levy revenue
- A significant food safety issue relating to mushrooms reduces consumer confidence and consumption
- Availability of the levy, its allocation and functions changes that prohibit the achievement of the SIP's outcomes.

Figure 5: SIP development process

APPENDIX 1: Consultation and validation

The SIP was developed in close consultation with the Australian Mushroom industry through the four-stage process formulated by Hort Innovation and illustrated in ***Figure 5***.

Pre-planning activities included review of relevant literature, analysis of past investments, preparation of an industry profile, engagement with the SIAP and Industry Representative Body – Australian Mushroom Growers Association (AMGA). Literature review focused on the Australian Mushroom Industry Strategic Plan 2011-16 and a number of levy funded projects reports.

Preparation tasks included gathering input and data to inform the SIP, completion of an environmental scan, review of consumer and retailer trends and discussion with industry on of innovative technology relevant to their industry. This process involved a range of large and smaller.

Key themes from this consultation were then discussed with the SIAP and an industry wide survey on line survey was carried out. The SIAP also provided advice that a national workshop that is open to all industry participants, not just growers should be held.

The online survey had eight responses and the themes raised in these responses were in line with the initial consultation of key stakeholders.

A national SIP workshop was held in Sydney where growers and researchers contributed to levy investment priorities, outcomes and strategies.

The outcome from this workshop was used to develop the initial draft of the SIP and an interactive workshop was held with the SIAP to ensure the document reflected the industry's intent.

Validation was completed through having the document available for public comment through in December 2016 and January 2017.

The following individuals were consulted during the development of this SIP (and their assistance is gratefully acknowledged).

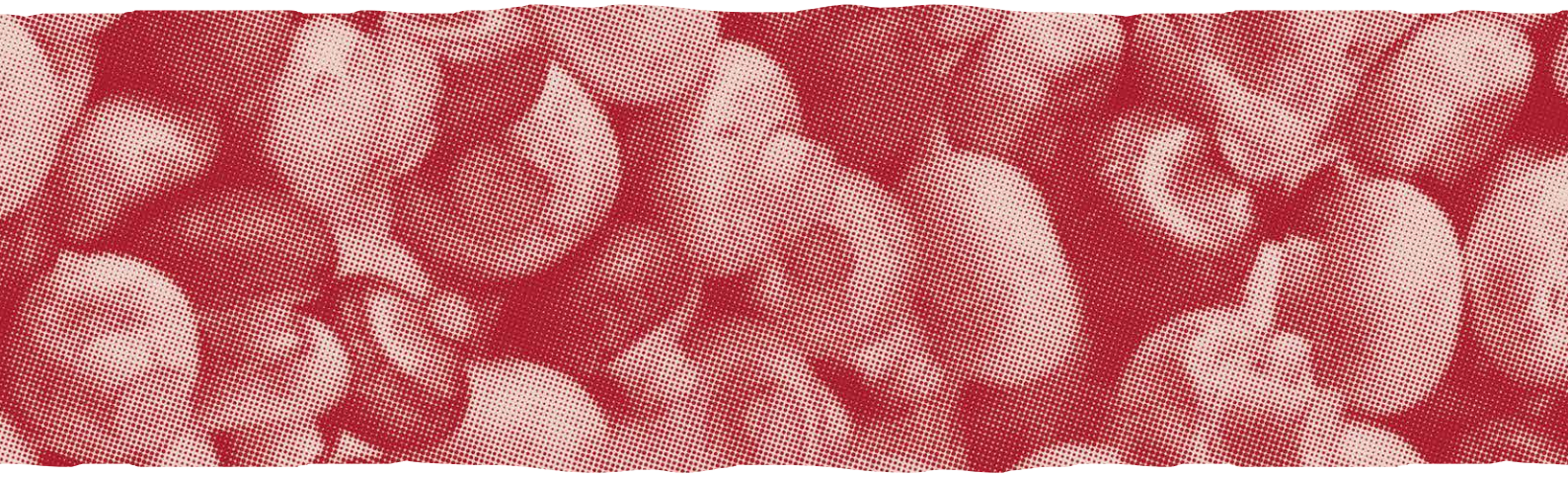
Name	Organisation
Kevin Tolson	Regal Mushroom
George Haggar	Costa Group
Mick Surridge	Bridgewater Compost
Robert Tolson	Elf Mushrooms
Sally Heukers	Australian Mushroom Growers Association
Trevor Jordon	Costa Group
Elisa Siliato	Costa Group
Steven Willemse	SJW Mushrooms
Matthew Fensom	Whitew Prince Mushroom
Tim Adlington	Parwan Valley Mushroom
Phil Rogers	P & L Rogers
Judy Allen	Consultant
Warwick Gill	Adelaide Mushrooms
Michael Kertesz	Sydney University
Neal Marland	Mushroom Composters
David Tolson	Regal Mushrooms
Chris Rowley	Team Rowley
Nick Femia	SA Mushrooms
Ian Chu	Majestic Mushrooms
Bill Littleson	Bulla Mushrooms
Douglas Schirripa	Adelaide Mushrooms

APPENDIX 2:
Logic hierarchy

Vision			To grow the future of Australia's horticulture industries			Common for all Investment
Mission	Increased profitability of Australia's horticulture industries		Increased productivity of Australia's horticulture industries		Increased global competitiveness of Australia's horticulture industries	
Hort Innovation end-of-strategy outcomes	**Support industry efficiency & sustainability**	**Improve productivity of the supply chain**	**Grow the horticulture value chain capacity**	**Drive long-term domestic and export growth**	**Lead strategically**	
End-of-SIP outcomes	*The industry-specific outcomes of the SIP. The final desired result of SIP investment but may be achieved after the SIP time-frame. SIP investment may be just one contributing factor to the achievement of these outcomes. For example, incremental productivity, profitability and competitiveness improvements stimulated through R&D, changes in consumer awareness, marketing campaign reach and influence and increased recognition of Australian horticulture products.*					SIP specific
SIP intermediate outcomes	*Short- to medium-term changes brought about through the SIP, which will support the achievement of end-of-SIP outcomes. For example, practice changes, adoption, changes in grower knowledge, attitudes, skills and aspirations (KASA) and marketing reach.*					
SIP activities and outputs	*What is directly delivered by the SIP (R&D, extension and marketing activities and outputs, for example, products and services, and events and engagement) across the 11 horticulture cross-sectoral investment themes: Pest and Disease Management, Crop Production, Sustainability Improvements, Novel Technologies, Data Insights,Industry Development, Product Integrity, International Market Development, Market Access and Trade, Domestic Market Development, Strategic Drive and Corporate Services.*					
Foundational activities	*Preliminary or preparatory activities that are conducted before and during SIP delivery. Includes industry processes, infrastructure and resources that enable the SIP to be developed and delivered. Includes SIP planning, consultation, advisory meetings etc.*					

APPENDIX 3:
Reference documents

Australian Mushroom Industry Strategic Plan 2011-16



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