

# Mushroom

## Strategic Investment Plan

2022-2026



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# EXECUTIVE SUMMARY

The overarching strategic intent of this Strategic Investment Plan (SIP) is to focus on category growth supported by innovations for improved efficiencies and sustainable production.

The mushroom SIP 2022-2026 provides a roadmap to guide Hort Innovation's investment of mushroom industry levies and Australian Government contributions, ensuring investment decisions are aligned with industry priorities.

The Australian mushroom industry situation in 2019/20 is described on **page 4** with further information provided in **Appendix 1**. Mushroom production volume has not fluctuated significantly over the past seven years, with 65,268 tonnes produced in 2012/13 compared to 68,823 tonnes in 2019/20. However, the 2019/20 figures include COVID disruptions, and a peak of 72,006 tonnes was achieved in the previous year (2018/19). In the same period, production value increased from \$301 million in 2012/13 to \$368 million in 2019/20, with a peak of \$457 million in 2017/18.

In 2019/20, the majority of Australian mushroom production was based in Victoria (35%), New South Wales (31%), and South Australia (17%), with lower volumes also produced in Western Australia (12%) and Queensland (6%).

Fresh domestic demand continues to be the focus for the industry, which accounted for 97% of the Australian mushroom market in 2019/20. Of this, foodservice accounted for 22% and processing a minor proportion at 2.5%. Export made up a very small proportion of total production with only 72 tonnes or 0.1% total production volume.

The strategic intent of the mushroom SIP provides a summary of how the mushroom industry will drive change over the life of the SIP. Ultimately the industry aims to achieve category growth supported by innovations for improved efficiencies and sustainable production.

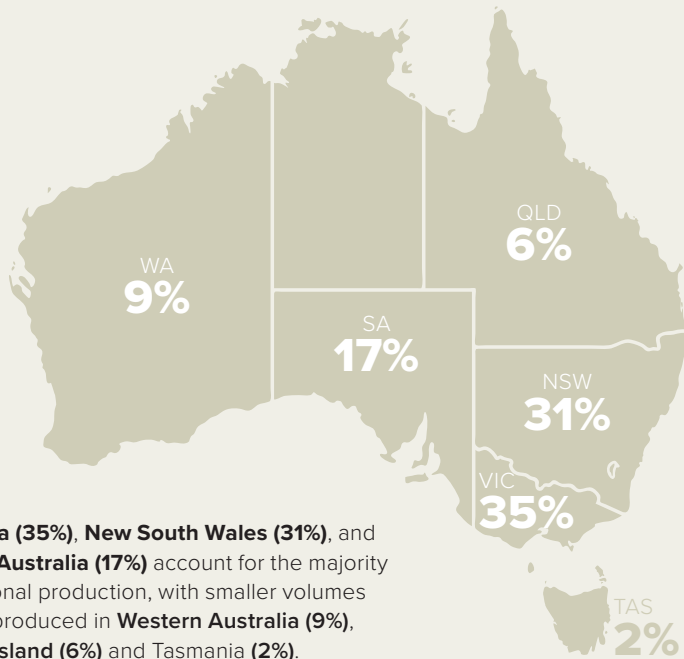
The financial estimates give an indicative overview of the funding availability for the period of FY2022-2026. Currently the mushroom research and development (R&D) and marketing funds have capacity to invest from FY2022. Careful prioritisation of future investment needs is required over the next five years.

The four outcome areas of this SIP cover significant themes under which programs and investments will be focused. These are listed in priority order for the mushroom industry with demand creation being the highest priority area. Demand creation will support the Australian mushroom industry to develop existing and future domestic markets through broadening consumer awareness of mushroom products and continuing to build on the mushroom brand, as well as developing stronger relationships throughout the supply chain. The next priority for the industry is improved supply, efficiency and sustainability, which will focus on innovative production systems, reduced costs, and effective risk management.

The key performance indicators (KPIs) detail how the impact of each strategy will be measured, for example, the use of nutritional information to support consumer demand; growth in production volume servicing foodservice; identification of technical barriers to viability of alternative production enhancements; and the adoption of sustainable integrated pest and disease (IPDM) strategies.

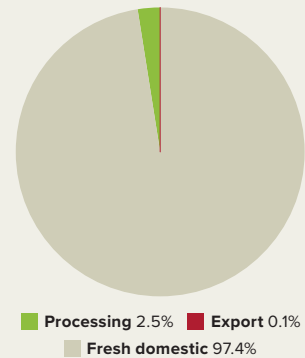


PRODUCTION AREAS:

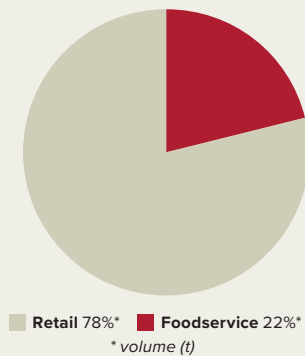


Victoria (35%), New South Wales (31%), and South Australia (17%) account for the majority of national production, with smaller volumes being produced in Western Australia (9%), Queensland (6%) and Tasmania (2%).

EXPORT/FRESH DOMESTIC/ PROCESSING:



RETAIL VS FOODSERVICE:



PRODUCTION WINDOW:



Year-round

NUMBER OF GROWERS:



<50

PER CAPITA CONSUMPTION:



2.75 kg

PRODUCTION VOLUMES:



68,823 tonnes

in 2019/20

FARMGATE VALUE OF PRODUCT:



\$368 million

in 2019/20

VARIETIES:



Agaricus bisporus

(button, cup, flat and brown mushroom)

Exotic mushroom varieties

(shiimeji and oyster)

GROWTH TRENDS:

SINCE 2012/13...

↑ PRODUCTION  
+3,555 tonnes

Production increased from 65,268 tonnes in 2012/13 to 68,823 tonnes in 2019/20.

# THE MUSHROOM STRATEGIC INVESTMENT PLAN

The mushroom SIP is the roadmap that will guide Hort Innovation's oversight and management of the mushroom industry's investment programs. It lays the foundation for decision-making in investments and represents the balanced interest of the whole industry. The important function of this SIP is to ensure that the investment decisions align with mushroom industry priorities.

Hort Innovation has led the process for preparing the refresh of the mushroom SIP, listening and engaging with levy payers and key stakeholders including Industry Representative Bodies (IRBs) and expertise available through advisory mechanisms and delivery partners. The refresh process involved consultation with and input from a wide range of levy payers, objective analysis of performance and learning from the previous SIP, as well as environmental scanning to identify emergent trends and issues that could impact on industry profitability and sustainability.

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

The whole-of-company approach taken by Hort Innovation to produce this SIP has harnessed existing external and internal knowledge, learning, partnerships and relationships. The output is a tailored plan with which the mushroom industry can be confident of its strategic intent, including visibility on how investment impacts will be identified. Specific investments to address the SIP strategies and align with industry strategic priorities will be outlined in detail via the mushroom Annual Investment Plan (AIP). The AIP will be published each year over the lifespan of the SIP and detail the investments that will be prioritised based on potential industry impact, as well as the availability of levy funds. Hort Innovation will advise industry stakeholders when the AIP has been published via established communication channels each year. The AIP will be developed with input from the mushroom Strategic Investment Advisory Panel (SIAP), IRBs and other key stakeholders.

Producers in the mushroom industry pay levies to the Department of Agriculture, Water and the Environment, which 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.

Levy is payable on mushrooms that are produced in Australia and either sold by the producer or used by the producer in the production of other goods. The R&D levy rate on mushrooms is set at \$1.08 per kilogram spawn and the marketing levy is set at \$2.92 per kilogram spawn.

Hort Innovation manages the mushroom levy funds proportion directed to R&D.

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.

This SIP represents the Australian mushroom industry's collective view of its R&D and marketing needs over the next five years (2022-2026). Learning, achievements and analysis of the previous SIP, consultation with Australian mushroom levy payers, and synthesis of various strategic documents have been incorporated into the development of this SIP. **Appendix 3** acknowledges the people who were consulted in the preparation and validation of this SIP. Statistics and data within this publication are sourced from the Australian Horticulture Statistic Handbook 2019/20 and other documents unless stated otherwise and are listed in **Appendix 4**. A list of acronyms used within the document is available in **Appendix 5**.



## Financial estimates

The annual revenue from levy income and Australian Government contributions for eligible R&D set the overall budget parameters for the mushroom SIP. Importantly, a portion of these funds is already committed, as the industry has current multi-year projects for R&D and marketing activities. In addition, the levy income from year to year will vary due to changes in seasonal and market conditions.

The indicative financial estimates used for the purposes of developing this SIP are presented in **Table 1** below. These figures are regularly reviewed to reflect the latest information and statistics for the industry and any changes in investment priority. Further details will be available in the AIP each year.

**TABLE 1. Indicative financial estimates for the mushroom SIP over the life of the SIP**

	2022 \$	2023 \$	2024 \$	2025 \$	2026 \$
<b>R&amp;D</b>					
<b>Balance end FY2021</b>	<b>2,642,385</b>				
Estimated levy funds (growers)	1,280,000	1,280,000	1,280,000	1,280,000	1,280,000
Australian Government contribution	2,284,314	1,416,955	1,277,393	1,222,607	1,248,558
Current investments	1,461,000	457,000	215,000	120,000	165,000
New investments	2,500,000	2,000,000	2,000,000	2,000,000	2,000,000
Total project investments	3,961,000	2,457,000	2,215,000	2,120,000	2,165,000
CCR	607,627	376,910	339,787	325,213	332,116
<b>Projected end balance</b>	<b>920,000</b>	<b>620,000</b>	<b>450,000</b>	<b>340,000</b>	<b>200,000</b>
<b>MARKETING</b>					
<b>Balance end FY2021</b>	<b>835,753</b>				
Estimated levy funds (growers)	3,500,000	3,500,000	3,500,000	3,500,000	3,500,000
Current investments	170,000	170,000	20,000	20,000	20,000
New investments	3,200,000	2,900,000	2,900,000	2,900,000	2,900,000
Total project investments	3,370,000	3,070,000	2,920,000	2,920,000	2,920,000
CCR	632,375	576,081	547,933	547,933	547,933
<b>Projected end balance</b>	<b>480,000</b>	<b>310,000</b>	<b>290,000</b>	<b>270,000</b>	<b>250,000</b>

*Disclaimer: All figures are indicative only and may change depending on actual income and expenditure.*

**Balance end FY2021** – The closing balance of the fund as at 30 June 2021

**Estimated levy funds** – Net levy income/revenue that is generated and collected by levy revenue services (LRS)

**Australian Government contribution** – Amount of contribution from the Australian Government on R&D levy-funded expenditure

**Current investments** – Current estimated value of contracted projects

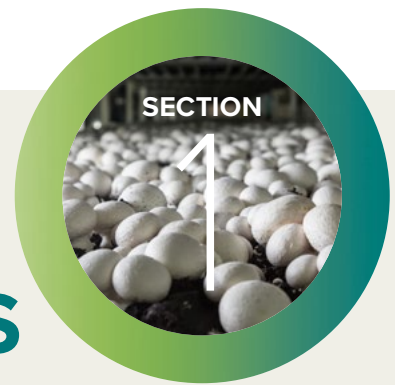
**New investments** – The estimated dollar value that is available for potential new investments for industry subject to industry advice

**CCR** – Corporate cost recovery: the cost to implement and manage R&D and marketing investment programs for each industry

**Projected end balance** – Forecast of the anticipated final position of the fund



# MUSHROOM INDUSTRY OUTCOMES



The overarching strategic intent of this SIP is to focus on category growth supported by innovations for improved efficiencies and sustainable production.

## Industry outcomes

Outcome statements as identified and prioritised by the mushroom industry have been prepared under four key outcome areas: demand creation; industry supply, productivity and sustainability; extension and capability; and business insights.

### **OUTCOME 1: Demand creation**

Contribute to increasing consumer knowledge, attitudes, and purchase intent to drive volume growth.

#### **Demand creation will support the industry in growing the mushroom category in Australia.**

The strategic intent of this outcome is to maintain and strengthen consumer demand, as the foundation for sustainable expansion of production and consumption in the domestic market. It means the industry is investing to:

- Broaden consumer awareness so that mushrooms are more top of mind and purchased more frequently
- Build a strong brand in 'Australian Mushrooms' by improving awareness, consideration, attitudes and knowledge
- Explore plant-based consumer awareness opportunities to increase consumption
- Support product positioning with evidence of beneficial health attributes and medicinal qualities which place mushrooms as a 'super food' and develop strong relationships across the supply chain, including foodservice channels and retail levers, with a shared goal to grow the category
- Identify and prioritise domestic market niches where there is demand and growth-potential for competitive supply of quality Australian mushrooms year-round to drive demand.

### **OUTCOME 2: Industry supply, productivity and sustainability**

Improve industry productivity (inputs/outputs) to maintain competitiveness and viability of supply.

#### **Supply and productivity will be supported through improvements to production efficiencies that will drive profitability outcomes, while ensuring long-term sustainability outcomes.**

The strategic intent of this outcome is to accelerate the application of production practices that optimise returns and reduce risk to growers. Achieving the outcome will involve focus on:

- Sustainability (circular economy opportunities)
- Carbon neutral opportunities and measurement of industry position
- Food safety, shelf-life and supply chain improvements
- Crisis management
- Proactively monitoring potential crop protection regulatory threats and having access to a broader suite of effective, socially acceptable and environmentally sound crop protection solutions.

**OUTCOME 3: Extension and capability**

Building capability and innovative culture.

**Building capability and an innovative culture will support industry to use the relevant investment outputs across the supply and demand initiatives to better manage risk and create positive change.**

The strategic intent of this outcome is to manage knowledge, relationships, systems and processes required to communicate effectively with internal and external stakeholders. Achieving the outcome will involve:

- Increasing knowledge, attitude, skills, aspiration (KASA) and practice for grower/industry profitability and sustainability through use of best practice and R&D outputs
- Active sharing of evidence to inform decision-making for businesses and for industry with investments and priority setting.

**OUTCOME 4: Business insights**

Measure industry supply (production) and demand (consumer behaviour) data and insights to inform decision-making.

**Business insights will support the industry to remain aware of market and industry trends to drive informed decision-making.**

The strategic intent of this outcome is to deliver data and insights which is foundational to achieving success in the other three outcome areas of demand creation; supply, productivity and sustainability; and extension and capability.

Achieving the outcome will involve reliable baseline data and analysis to provide insights and understand current and emerging trends. Key investments will support the provision of consumer knowledge and tracking, production statistics and forecasting and independent reviews to enable better decision-making process at industry level and individual businesses.

These investments underpin and are complementary to delivery of the other outcome areas.

“  
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mushroom industry priorities.”



# MUSHROOM INDUSTRY STRATEGIES



## Strategies to address industry investment priorities

The tables below describe the strategies and identified impacts for each of the key outcome areas. The highest priority investments lay the foundation for the SIP and its implementation will require a balanced approach to ensure the industry has a high likelihood of success over the short (0-3 years), medium (3-5 years) and long term (5-10 years).

The ability to deliver on these strategies (and subsequent investments) will be determined by the ability of the statutory levy to provide the resources to do so. Further resources and efficiencies may potentially become available through alternative funding sources by way of Hort Frontiers strategic partnership initiative, external grants and/or cross-industry initiatives.

### OUTCOME 1: Demand creation

Demand creation supports the Australian mushroom industry to develop existing and future domestic markets.

STRATEGIES	POTENTIAL BENEFIT OR IMPACT
1. Increase domestic consumer demand for Australian mushrooms through improving knowledge, attitudes and purchase intent	<ul style="list-style-type: none"> <li>Increased consumer demand for Australian mushrooms</li> <li>Increased awareness of the health and nutritional benefits of mushrooms</li> </ul>
2. Increase domestic consumer demand for fresh, quality Australian mushrooms through alternative menu uses in foodservice channels including in the fast food sector	<ul style="list-style-type: none"> <li>Greater recognition of the nutritional and health benefits of mushrooms by food industry professionals</li> </ul>
3. Explore and assess opportunities for mushroom exports into viable high value markets (e.g., Southeast Asia)	<ul style="list-style-type: none"> <li>Identification of viable new markets</li> </ul>
4. Explore opportunities for increased use of Australian mushrooms in the processing/manufacturing sector and other developments in value-add products	<ul style="list-style-type: none"> <li>Reduced need for mushroom imports and diversification opportunities for Australian mushroom growers</li> </ul>



**OUTCOME 2: Industry supply, productivity and sustainability**

The Australian mushroom industry has improved profitability, efficiency and sustainability through innovative production systems, reduced costs, and effective risk management.

STRATEGIES	POTENTIAL BENEFIT OR IMPACT
1. Enhance the efficiency of mushroom production systems including casing, compost, labour and energy	<ul style="list-style-type: none"> <li>• Industry profitability and sustainability</li> </ul>
2. Improve on-farm sustainability and efficiency including through waste product development and recycling opportunities	<ul style="list-style-type: none"> <li>• Industry sustainability practices reinforce product positioning with consumers</li> <li>• Development of guidelines for the recycling of waste products in a circular economy model</li> <li>• Enhanced social licence</li> </ul>
3. Improve the presentation, storage and shelf life of mushrooms through new, focused R&D initiatives in collaboration with retail and supply chain partners	<ul style="list-style-type: none"> <li>• Improved quality and freshness of mushrooms on retail displays (information from cool chain studies)</li> <li>• Treatments to improve shelf-life quality</li> <li>• Improved packaging options</li> </ul>
4. Improve industry preparedness and resilience to biosecurity threats	<ul style="list-style-type: none"> <li>• Secure productivity based on reduced biosecurity risk</li> </ul>
5. Develop and optimise fit for purpose pest and disease management strategies including integrated pest management (IPM) and biological agents as part of mushroom production systems	<ul style="list-style-type: none"> <li>• Crop loss reduced by sustainable pest and disease management practises</li> <li>• Increased industry awareness of existing and emerging pests and diseases</li> </ul>
6. Support an Australian mushroom centre of excellence for compost and mushroom production research, development and extension (RD&E)	<ul style="list-style-type: none"> <li>• Improved research capacity</li> </ul>
7. Prioritise the major crop protection gaps through a Strategic Agrichemical Review Process (SARP)*	<ul style="list-style-type: none"> <li>• Available registered or permitted pesticides are evaluated for overall suitability against major disease, insect pests and weed threats. The SARP aims to identify potential future solutions where tools are unavailable or unsuitable</li> </ul>
8. Provide regulatory support and co-ordination for crop protection regulatory activities with the potential to impact plant protection product access, both in Australia and internationally*	<ul style="list-style-type: none"> <li>• Regulatory Risk Assessments have informed proactive strategic priority setting to avoid pest management gaps in the event access or use is negatively impacted</li> </ul>
9. Generate residue, efficacy and crop safety data to support applications to the Australian Pesticides and Veterinary Medicines Authority (APVMA) to gain, maintain or broaden access to priority uses for label registrations and/or minor use permits for crop protection needs*	<ul style="list-style-type: none"> <li>• Crop protection solutions meet industry priority needs as identified in the industry SARP or biosecurity plan</li> </ul>



**OUTCOME 3: Extension and capability**

Improved capability and an innovative culture in the Australian mushroom industry maximises adoption of investments in productivity and demand.

STRATEGIES	POTENTIAL BENEFIT OR IMPACT
1. Deliver communication and extension capability to support positive change in the areas of pest and disease management, biosecurity, food safety and supply chain practices along with enhancements to production and on-farm sustainability	<ul style="list-style-type: none"> <li>A change/progression in awareness, knowledge and skills for grower/industry profitability and sustainability which supports the adoption of best practices and innovations</li> </ul>
2. Strengthen industry leadership through initiatives and training	<ul style="list-style-type: none"> <li>Proactive strategic and evidence-based decision-making in businesses and for industry on investment, priorities and risk management</li> </ul>

**OUTCOME 4: Business insights**

The Australian mushroom industry is more profitable through informed decision-making using consumer knowledge and tracking, trade data and production statistics, forecasting, and independent reviews.

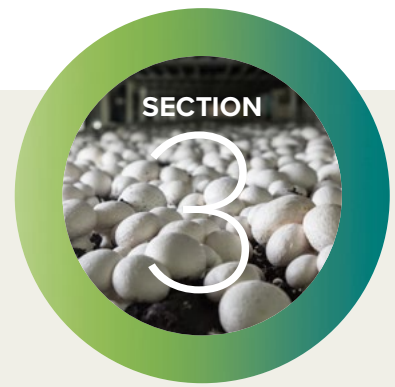
STRATEGIES	POTENTIAL BENEFIT OR IMPACT
Increase industry alignment with quality and brand-positioning opportunities driven by consumer insights*	<ul style="list-style-type: none"> <li>Provision of business insights to deliver against demand, supply and extension outcomes</li> </ul>
Use production forecasts to inform long-term and/or in-season market planning and supply strategies	<ul style="list-style-type: none"> <li>Increased industry or other stakeholder capacity</li> </ul>

\* Foundational investments provide data and information that underpin the delivery of other SIP outcome areas and will be aligned to this strategy. Foundational investment areas include:

- Consumer behavioural data
- Consumer usage and attitudes, and brand health tracking data
- Impact assessments
- Trade data
- Crop protectant data.

“The mushroom SIP is the roadmap that will guide Hort Innovation’s oversight and management of the mushroom industry’s investment programs.”





# MUSHROOM SIP MONITORING AND EVALUATION

The mushroom SIP Monitoring and Evaluation (M&E) Framework development has been informed by Hort Innovation’s Organisational Evaluation Framework.

Progress against the SIP will be reported in Hort Innovation publications and through industry communication channels. The SIP outcomes and strategies are used to inform KPIs that in turn drive the investments and individual projects to deliver on the SIP. Projects responsible for delivering the strategy aligned with each KPI will collect the data.

An M&E and reporting framework is shown below. The framework shows what will be measured to demonstrate progress against the SIP and how metrics will be tracked. Reporting on KPIs will be processed through various formal channels to inform industry and government investors of progress, performance, and impact. Data sources to support M&E will be identified and collected as part of the requirements for each levy investment.

Hort Innovation will facilitate the regular review of the SIP to ensure it remains relevant to industry

## Mushroom SIP Monitoring and Evaluation Framework

The mushroom SIP M&E plan is shown below. It includes KPIs and data collection methods both at a macro/industry (trend) level and at more specific SIP strategic level/s.

OUTCOME	STRATEGIES	KPIs
<b>Demand creation</b>		
<b>Outcome 1:</b> Demand creation supports the Australian mushroom industry to develop existing and future domestic markets.	1. Increase domestic consumer demand for Australian mushrooms through improving knowledge, attitudes and purchase intent	<ul style="list-style-type: none"> <li>Positive influence on consumer preference</li> <li>Use of nutritional information to support consumer demand</li> </ul>
	2. Increase domestic consumer demand for fresh, quality Australian mushrooms through alternative menu uses in foodservice channels including in the fast food sector	<ul style="list-style-type: none"> <li>Increased use of Australian mushrooms in menus</li> <li>Growth in production volume servicing foodservice</li> </ul>
	3. Explore and assess opportunities for mushroom exports into viable high value markets (e.g., Southeast Asia)	<ul style="list-style-type: none"> <li>Development of consumer market intelligence research and an export strategy with consideration for market access requirements</li> </ul>
	4. Explore opportunities for increased use of Australian mushrooms in the processing/manufacturing sector and other developments in value-add products	<ul style="list-style-type: none"> <li>Industry has an increased knowledge and awareness of feasible processing/manufacturing sector supply opportunities</li> <li>New value-add product development opportunities for Australian mushrooms are understood</li> </ul>



OUTCOME	STRATEGIES	KPIs
<b>Industry supply, productivity and sustainability</b>		
<p><b>Outcome 2:</b> The Australian mushroom industry has improved profitability, efficiency and sustainability through innovative production systems, reduced costs, and effective risk management.</p>	1. Enhance the efficiency of mushroom production systems including casing, compost, labour and energy	<ul style="list-style-type: none"> <li>• Identification of technical barriers to viability of alternative production enhancements</li> <li>• Availability of new knowledge for growers to reduce input cost per tonne of yield</li> </ul>
	2. Improve on-farm sustainability and efficiency including through waste product development and recycling opportunities	<ul style="list-style-type: none"> <li>• Industry adoption of innovative and novel approaches to waste stream management</li> <li>• Reduction of on-farm waste and associated costs</li> <li>• Growers utilising novel technology to add value and manage waste streams in production</li> </ul>
	3. Improve the presentation, storage and shelf life of mushrooms through new, focused R&D initiatives in collaboration with retail and supply chain partners	<ul style="list-style-type: none"> <li>• Availability of new knowledge to improve the shelf life and shelf appeal of mushrooms</li> </ul>
	4. Improve industry preparedness and resilience to biosecurity threats	<ul style="list-style-type: none"> <li>• Maintenance/tracking of the implementation of an industry biosecurity plan</li> <li>• Investigation of risk pathways (e.g., imported fresh mushrooms)</li> </ul>
	5. Develop and optimise fit for purpose pest and disease management strategies including IPM and biological agents as part of mushroom production systems	<ul style="list-style-type: none"> <li>• Development of pest and disease management strategies that mitigate crop loss in collaboration with other growers</li> <li>• Increased adoption of IPDM and reduction in crop loss through sustainable pest and disease management practices</li> </ul>
	6. Support an Australian mushroom centre of excellence for compost and mushroom production RD&E	<ul style="list-style-type: none"> <li>• Evidence of industry support and engagement for driving RD&amp;E</li> </ul>
	7. Prioritise the major crop protection gaps through a SARP*	<ul style="list-style-type: none"> <li>• Coordinated industry priority setting with a clear outlook of gaps and risks in existing pest control options</li> <li>• Industry priority needs published and shared with stakeholders, including registrants</li> </ul>
	8. Provide regulatory support and co-ordination for crop protection regulatory activities with the potential to impact plant protection product access, both in Australia and internationally*	<ul style="list-style-type: none"> <li>• Regulatory Risk Assessments maintained</li> </ul>
	9. Generate residue, efficacy and crop safety data to support applications to the APVMA to gain, maintain or broaden access to priority uses for label registrations and/or minor use permits for crop protection needs*	<ul style="list-style-type: none"> <li>• Data to support applications to the APVMA and the establishment of Maximum Residue Limits (MRLs)</li> </ul>



OUTCOME	STRATEGIES	KPIs
<b>Extension and capability</b>		
<b>Outcome 3:</b> Improved capability and an innovative culture in the Australian mushroom industry maximises adoption of investments in productivity and demand.	1. Deliver communication and extension capability to support positive change in the areas of pest and disease management, biosecurity, food safety and supply chain practices along with enhancements to production and on-farm sustainability	<ul style="list-style-type: none"> <li>• Communication and extension plan developed with industry</li> <li>• Establishment of a baseline in relation to those farm managers having an awareness and/or introduced improved management (such as biosecurity, food safety and growing) to enhance supply, expressed as the percentage of total production under improved management systems</li> </ul>
	2. Strengthen industry leadership through initiatives and training	<ul style="list-style-type: none"> <li>• Establishment of an industry people development strategy</li> <li>• Increased participation in industry leadership and training initiatives</li> <li>• Maintenance/tracking of an industry risk register and crisis management plan</li> </ul>
<b>Business insights</b>		
<b>Outcome 4:</b> The Australian mushroom industry is more profitable through informed decision-making using consumer knowledge and tracking, trade data and production statistics, forecasting, and independent reviews.	1. Increase industry alignment with quality and brand-positioning opportunities driven by consumer insights*	<ul style="list-style-type: none"> <li>• Delivery of a consumer insights strategy</li> <li>• Evidence that consumer insights inform market engagement (e.g., case studies)</li> <li>• Availability of new consumer knowledge for growers</li> </ul>
	2. Use production forecasts to inform long-term and/or in-season market planning and supply strategies	<ul style="list-style-type: none"> <li>• Production forecast available</li> <li>• Evidence that production forecasts support marketing and production decisions</li> </ul>

\* Foundational investments provide data and information that underpin the delivery of other SIP outcome areas and will be aligned to this strategy. Foundational investment areas include:

- Consumer behavioural data
- Consumer usage and attitudes, and brand health tracking data
- Impact assessments
- Trade data
- Crop protectant data.

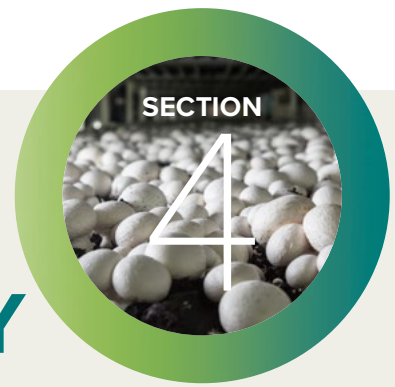
## Reporting framework

Hort Innovation will use dynamic reporting aligned to the Organisational Evaluation Framework to report regularly on progress and performance. Reporting will be processed through formal channels to inform industry and government investors.

A review of investment performance against the respective industry outcome and/or strategy-level KPIs for the mushroom SIP will be completed annually as the primary reporting mechanism. The SIP performance report will provide:

- Evidence of progress towards achieving the industry-specific outcomes and strategies through an assessment of the KPIs identified in the SIP
- Evidence of progress towards cross-industry investment strategies and outcomes. It will involve Hort Innovation's whole-of-horticulture reporting obligations and corporate plan and involve annual reports and Hort Innovation's Annual Operating Plan.

SIP performance reports will also inform the Australian Government of progress towards achieving government priorities. In particular, reporting will support Hort Innovation to meet the Performance Principles and requirements contained in the [Deed of Agreement 2020-2030](#).



# COLLABORATION AND CROSS-INDUSTRY INVESTMENT

Based on advice from industry throughout the engagement process, Hort Innovation understands that Australian horticulture industries have common issues, and in turn have identified prospective areas for collaboration and cross-industry or regional investment.

These opportunities have been included as strategies across multiple industry SIPs where relevant and required. By delivering targeted multi-industry collaboration in RD&E, marketing and trade, Hort Innovation aims to support more effective and efficient outcomes for growers and the wider horticulture sector. This includes driving investment through the Hort Frontiers strategic partnership initiative. Importantly, while this approach acknowledges there is value in solving issues across industries and regions, it does not reduce the importance of industry-specific initiatives.

Cross-industry/regional R&D opportunities identified for the mushroom industry include:

- Nutritional health benefits
- Quality – freshness in supply chain.

Cross-industry areas of collaboration for demand-driving outcomes provide the opportunity to advance the prosperity of the sector through gaining efficiencies in the delivery of the program and contributing to stronger overall outcomes. By collaborating as one sector to win the hearts and minds of the consumers, in addition to individual demand-driving programs, there is the potential to enhance the total category value proposition, contributing to driving returns for Australian growers.

Areas of consideration for collaboration for demand-driving outcomes across the lifespan of the 2022-2026 SIP include:

- All-of-horticulture consumer marketing campaigns designed to drive awareness, consideration, and purchase behaviour change
- Communications to bring horticulture to top of mind (saliency) and reposition the benefits they provide to Australian and international consumers
- Retail partnerships to advance total category and shopper demand-driving programs

- A global brand platform to reinforce the unique selling proposition of Australian-grown horticultural produce and drive preference with international consumers.

## Strategic science and research focus

The mushroom SIP takes into consideration the research priorities of various industry stakeholders, including Australian Mushroom Growers Association (AMGA) and Australian Fresh Produce Alliance (AFPA), and acknowledges the representation of these organisations. In developing the strategies presented within the mushroom SIP, the strategic research areas have been considered are listed in **Table 2**.

**TABLE 2. Mushroom research priorities**

Sustainability (climate change, water, packaging and shelf life)
Trade (market access, industry capability development)
Biosecurity (managing pest and disease, IPM, chemistry)
Food safety (systems and technology)

Collaboration across the agriculture research community is essential, including with Industry Representative Bodies (IRBs) and organisations such as the CSIRO, universities, private enterprise and state government agencies. Hort Innovation is a member of the National Horticulture Research Network (NHRN) together with other senior horticultural R&D representatives from state and Australian Government agricultural agencies and selected institutes. The NHRN is responsible for the development and implementation of the broader Horticulture RD&E Strategy under the National Primary Industries RD&E Framework.

During the engagement process, key delivery partners were contacted including lead agencies within the NHRN Framework as well as specific delivery partners for each industry. In addition, priorities and opportunities identified within the strategic plans of national and state agencies and research organisations have been considered in the development of Hort Innovations SIPs where applicable.

**TABLE 3. Government and key agency priorities**

Rural RD&E for Profit priorities	Australian Government Science and Research priorities
Advanced technology	Food
Biosecurity	Soil and water
Soil, water and managing natural resources	Advanced manufacturing
Adoption of R&D	Environmental change
	Health

This SIP has been developed alongside the government and key agency priorities listed in **Table 3**, with consideration of issues faced by the mushroom industry. These strategic areas further emphasise the opportunity and importance of cross-industry and regional collaboration. All the priority areas are of importance to Australian horticulture, and these will play a role in driving the efficiency and effectiveness of investment across the sector.

## Annual investment planning

Specific investments to address the SIP strategies and align with industry strategic priorities will be outlined in detail each year via the mushroom AIP. Investment decisions are guided by the SIP and prioritised based on potential industry impact, as well as the availability of levy funds each year. The AIP will be developed with input from the mushroom SIAP, which is made up of growers and other industry representatives as well as IRBs and other key stakeholders. Wherever possible, investments will be aligned to form multi-industry projects to increase the efficiency of funding availability. Details of the SIAP can be found on the Hort Innovation website [here](#), and the AIP will be published on the same page each year.

## Investment opportunities through Hort Frontiers

Innovation is key to the future success of Australian horticulture. The next evolution of the long-range, higher risk and transformational R&D that has the potential to make a significant impact will be possible through Hort Innovation's Hort Frontiers program strategic partnership initiative.

Hort Frontiers is a strategic partnership initiative that facilitates collaborative, cross-industry investments focused on the longer term and more complex themes identified as critical for Australian horticulture by 2030. The partnership framework is currently being established and will include a number of key investment themes for potential investment to guide the initiative and drive transformational R&D across horticulture. Key investment themes will include:

- Environmental sustainability (water, soil and climate)
- Pollination
- Green cities
- Biosecurity
- Health, nutrition and food safety
- Advanced production systems
- International markets
- Leadership
- Novel food and alternate uses (waste reduction).

The development of these areas for investment will benefit all of horticulture, with support from partners with aligned priorities to co-invest in deliverables identified that require alternative funds available outside the levy. Hort Frontiers is being developed to align with the Australian-grown Horticulture Sustainability Framework to invest in specific impact areas to drive innovation and sustainability initiatives.

The mushroom industry views a number of these investment areas as opportunities for success into the future, including:

- Advanced production systems
- Novel food and alternate uses (waste reduction)
- Health, nutrition and food safety
- Leadership.

Partnering with Hort Frontiers on these areas would provide the mushroom industry with opportunities for access to world class research, specialised project management teams and large-scale R&D.

### Australian-grown Horticulture Sustainability Framework

Hort Innovation has developed the Australian-grown Horticulture Sustainability Framework report, aiming to strengthen the horticulture industry’s sustainability to meet the changing expectations and needs of growers, consumers, the community, investors and governments. The report applies across the whole of Australian horticulture, including fruits, vegetables, nuts and nursery stock. Through widespread consultation with industry and external groups, proposed sustainability goals and indicators were identified and are detailed within the framework. The framework is aligned to the UN Sustainable Development Goals.

Four key pillars were identified in the framework (*Figure 1*).



The framework should be cross-referenced when undertaking prioritisation of investments. At the time of publication, Hort Innovation is working with industry groups regarding the overall responsibility for the framework, setting and reporting progress against the framework targets and performance measures.

View the Australian-grown Horticulture Sustainability Framework on the Hort Innovation website [here](#).

**Table 4** provides examples of mushroom SIP strategies showing how the industry is already aligning to the framework.

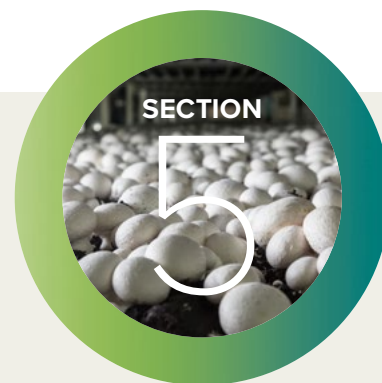
**TABLE 4. Mushroom SIP strategy examples showing how the industry is already aligning to the Australian-grown Horticulture Sustainability Framework**

STRATEGY	IMPACT	SUSTAINABILITY GOAL
Enhance the efficiency of mushroom production systems including casing, compost, labour and energy	<ul style="list-style-type: none"> <li>Industry profitability and sustainability</li> </ul>	Planet & Resources People & Enterprise
Improve on-farm sustainability and efficiency including through waste product development and recycling opportunities	<ul style="list-style-type: none"> <li>Industry sustainability practices reinforce product positioning with consumers</li> <li>Development of guidelines for the recycling of waste products in a circular economy model</li> <li>Enhanced social licence</li> </ul>	Planet & Resources Less Waste





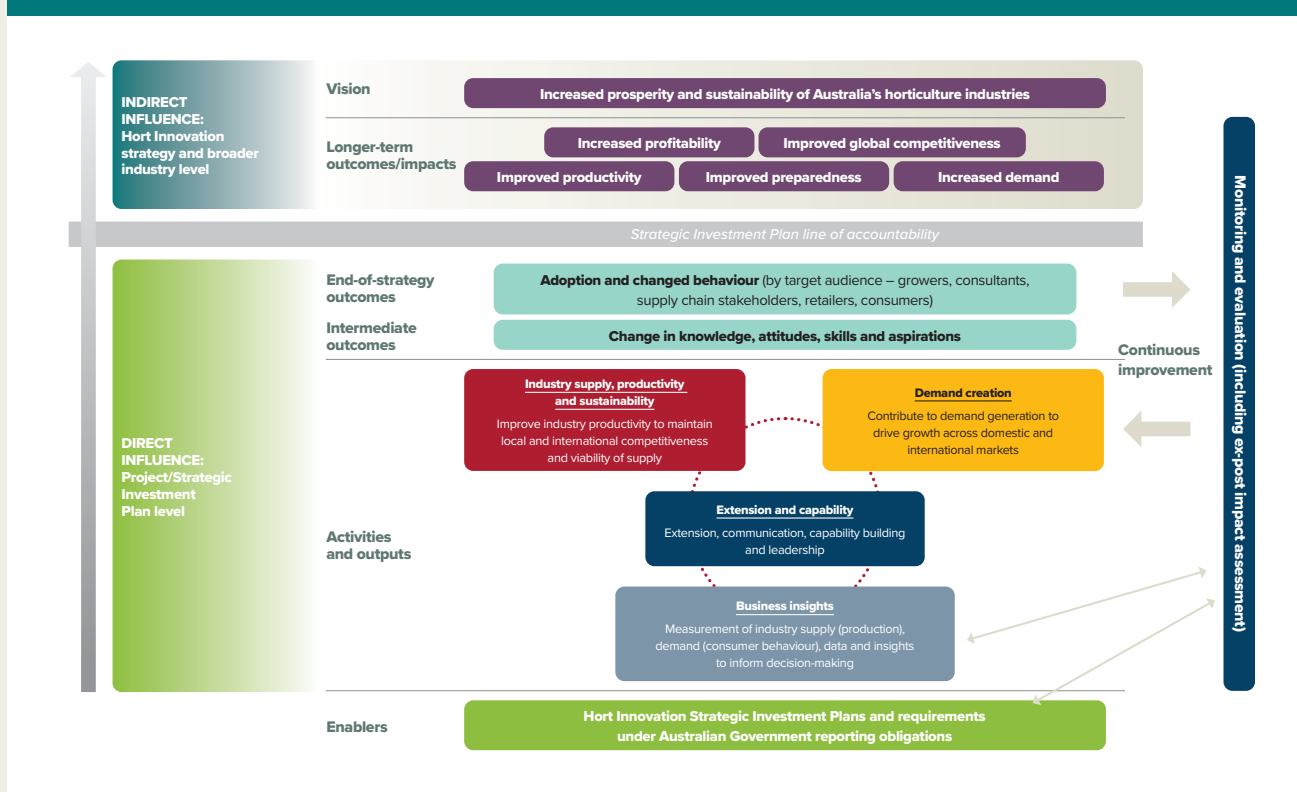
# HORT INNOVATION



## Strategic Investment Plan logic

The SIP logic (**Figure 2**) identifies how investment activities and outputs (delivered through each SIP outcome area) will support changes in industry KASA, which drive adoption and behaviour change. Beyond the SIP, investment will contribute to driving longer-term impacts for the sector like increased preparedness, demand, productivity, global competitiveness and profitability. Realising these impacts will support Hort Innovation’s vision of increased prosperity and sustainability of Australia’s horticulture industries.

**FIGURE 2. Strategic Investment Plan logic**



## Aligning to Hort Innovation investment priorities

Hort Innovation is committed to sustainable growth in horticulture, with the overarching aim of increasing the sector’s value to \$20 billion by 2030. We will do this through implementing the SIP and investments against the three core pillars, committed to:

1. Drive knowledge and innovation into horticulture industries
2. Deliver the highest value R&D, marketing and international trade investments across industries now and into the future
3. Enable activities that drive all strategic imperatives.

Hort Innovation is governed by a Deed of Agreement with the Australian Government, which allows for the transfer

and investment of levies and Australian Government contributions. As a Research and Development Corporation (RDC), Hort Innovation is able to leverage industry levy investments in RD&E with Government funds up to a value of 0.5% of the industry’s gross value of production. All investments made by Hort Innovation are thoroughly considered to ensure they contribute to the guiding performance principles:

- Productivity
- Profitability
- Preparedness for future opportunities and challenges
- Competitiveness
- Demand: demonstrates how productivity, preparedness and demand lead to profitability and competitiveness and sustainability.

# APPENDICES

## APPENDIX 1: Industry context

### Industry supply chain

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 are 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 mushrooms) as well as exotic mushroom varieties including shimeji and oyster.

A large amount (97%) of mushrooms produced locally are consumed in the fresh market with less than 1% of fresh production exported. There are limited export market opportunities due to the high cost of production in Australia. Prepacked and value-added mushrooms, such as sliced mushrooms, are growing market segments. Currently less than 3% of fresh production mushrooms are used in processing.

Foodservice is an important sector for the industry, with 22% of fresh supply sent to foodservice in 2019/20 and 78% sent to retail. This is greater than the amount for total vegetables, which was 17% to foodservice in 2019/20. Foodservice is an important sector for the industry, with 22% of fresh supply sent to foodservice in 2019/20 and 78% sent to retail. This was a greater percentage than for the broader vegetable category of which 17% went to foodservice in 2019/20. This figure is expected to remain at a similar level for 2020/21 and then increase as foodservice demand rebounds post COVID.

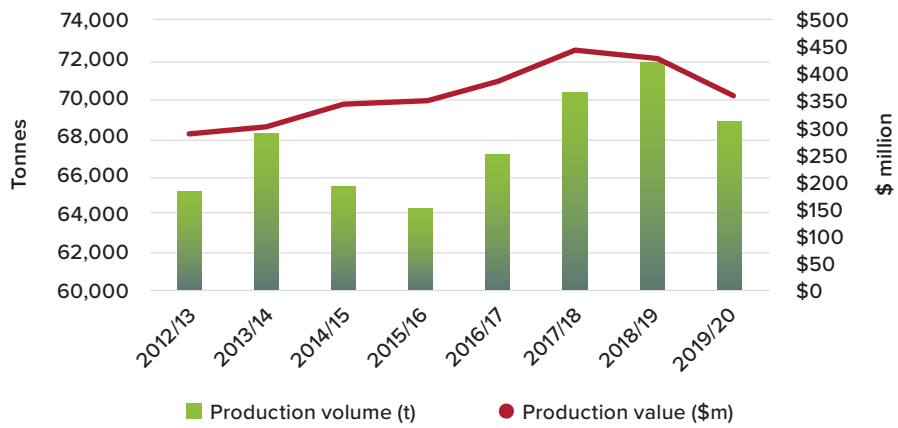
### Domestic consumers and drivers of demand

While mushrooms have not historically been a large part of the traditional “meat and three vegetables” approach, current Nielsen data suggests 80% of Australian households now purchase mushrooms. 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 2.7 kilograms per person. The consumption of mushrooms per capita in Canada, a similar market, is 3.5 kilograms per person. 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.



Industry production

**FIGURE 3.** Mushroom production, 2012/13 to 2019/20



Source: Australian Horticulture Statistics Handbook (2019/20)

Mushroom production grew rapidly from 2015/16 to 2018/19, which drove value growth over this period. There has also been strong price growth, with unit value increasing from \$4.61 per kilogram in 2012/13 to \$6.48 per kilogram in 2017/18. Over the past two years, however, unit value has decreased from the peak of \$6.48 per kilogram to \$5.34 per kilogram. This caused a decrease in production value from 2017/18 to 2018/19 despite an increase in production volume (**Figure 3**). Value dropped significantly in 2019/20 due to a decrease in production volume and a decrease in unit price. It is likely part of this was due to COVID-related shutdowns in demand from the foodservice sector.





## APPENDIX 2: Mushroom industry situation analysis

At the time of refreshing the SIP in 2021, the global coronavirus (COVID-19) pandemic continues to affect horticulture industries to varying degrees. Although the outcome and ultimate impact of the pandemic are unknown, areas of investment across horticulture that may be influenced over the period of this SIP include export and trade relationships, domestic and international demand, logistics and supply chain, labour supply – all having potential impacts on grower profitability.

Environmental, economic and social sustainability are vitally important to Australian horticultural growers and industries. Customers, consumers, and investors also seek information about the sustainability and ethics of how their food is produced. Sustainability is particularly crucial as topics such as climate variability, health and ethics continue to shape the social, environmental, and political landscape for agricultural industries. The impact of these issues may have influence on a range of investment areas for horticulture from production practices and land management, demand and reputation of products, quality expectations and cultural/community engagement.

### Strengths, weaknesses, opportunities and threats

**Table 5** has been used to analyse the mushroom industry's strengths, weaknesses, opportunities, and threats (SWOT). The SWOT tool assists the industry to build on what works, observe what is lacking, minimise risks, and take the greatest possible advantage of chances for success.

**TABLE 5. Mushroom SWOT analysis**

The mushroom industry	
<b>Strengths</b>	<ul style="list-style-type: none"> <li>• Unity – a close-knit industry that works together to achieve beneficial outcomes for the whole industry</li> <li>• The predictable and consistent supply of mushrooms</li> <li>• Australia is seen as a producer of 'clean and green' products</li> <li>• Mushrooms are a great, healthy, clean product for consumption and available year-round</li> <li>• The Peak Industry Body, Australian Mushroom Growers' Association, is strong and professional</li> <li>• High entry cost, technical industry</li> <li>• Collaboration and clear vision</li> <li>• Minimal fresh imports or international competition</li> <li>• Hort Innovation structure supported by an effective mushroom SIAP</li> <li>• The industry's marketing and promotions program</li> </ul>



The mushroom industry	
<b>Weaknesses</b>	<ul style="list-style-type: none"> <li>• 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</li> <li>• Exposure to high labour costs</li> <li>• Difficult for smaller farms to compete</li> <li>• Australia's retail landscape is dominated by three major retailers</li> <li>• The Australian mushroom industry has not been able to improve farmgate prices relative to consumer price index (CPI)</li> <li>• High cost and small market</li> <li>• Lack of scientific understanding of the growing process</li> <li>• Lack of export cold chain combined with high labour costs means that Australian mushrooms are not competitive overseas</li> <li>• Industry's understanding of the role of the SIAP</li> <li>• Competition from other food products particularly in the summer months</li> <li>• Trends towards pre-pack bringing down the average buying size of mushrooms</li> <li>• Australia has a high cost of production for mushroom production</li> </ul>
<b>Opportunities</b>	<ul style="list-style-type: none"> <li>• Increasing demand by ensuring mushrooms are top of mind with the consumer</li> <li>• Expanding on the unique health benefits of mushrooms and meat free alternative</li> <li>• Building a presence in the value adding sector and making product more available to caterers of large functions</li> <li>• Export marketing opportunities</li> <li>• Targeted and effective marketing and promotion program to continually increase consumption of mushrooms</li> <li>• Boost mushroom consumption in summer</li> <li>• Grow demand for fresh loose and bulk mushrooms</li> <li>• Foodservice marketing and promotion program</li> <li>• Creation of centre of excellence providing cross-sector research</li> <li>• Positive waste stream opportunities i.e. spent mushroom compost</li> </ul>
<b>Threats</b>	<ul style="list-style-type: none"> <li>• Rising water, labour and power costs above CPI</li> <li>• Imported mushroom products</li> <li>• A potential major food scare related to mushrooms such as listeria</li> <li>• Ineffective promotional programs especially in summer</li> <li>• Increased disease potential</li> <li>• Farms increasing capacity ahead of demand</li> <li>• Lower prices</li> <li>• Poor impression of horticultural industry as not paying well making it difficult to attract and retain skilled and competent staff resulting in loss of industry knowledge</li> <li>• Reduced access to chemicals</li> <li>• Reduced profitability</li> <li>• Ageing industry (farms, growers, researchers, consultants, auditors, accreditation)</li> </ul>



### APPENDIX 3: People consulted

The following people are acknowledged for their contribution to the mushroom SIP development process.

NAME	INDUSTRY ROLE	REGION
Geoff Martin	Chair, Australian Mushroom Growers' Association, Marsh Lawson Mushroom Research Centre	New South Wales
Kevin Tolson	Deputy Chair, Australian Mushroom Growers' Association; Mushroom SIAP; Grower,	New South Wales
Jose Cambon	Grower	Victoria
Elisa Siliato	Grower	Victoria
Phil Higgins	Director, Australian Mushroom Growers' Association; Mushroom SIAP; Grower	Victoria
Jaylon Rogers	Director, Australian Mushroom Growers' Association; Grower	South Australia
Phil Rogers	Grower	South Australia
Nick Femia	Grower, Mushroom SIAP	South Australia
David Tolson	Grower, Mushroom SIAP	New South Wales
Robert Tolson	Grower	New South Wales
Gordon Rogers	Researcher	New South Wales
Tim Adlington	Chair, Marsh Lawson Mushroom Research Centre	New South Wales
Michael Kertesz	Researcher, Mushroom SIAP	New South Wales
Judy Allan	Marsh Lawson Mushroom Research Centre	New South Wales
Anne Bleads	Marsh Lawson Mushroom Research Centre	New South Wales
Georgia Beattie	Director, Australian Mushroom Growers' Association; Grower	Victoria
Mohammad Mirzadeh	Director, Australian Mushroom Growers' Association; Grower	Victoria
Mick Surridge	Director, Australian Mushroom Growers' Association; Grower	Victoria
Martine Poulain	Relationship and General Manager, Australian Mushroom Growers' Association; Mushroom SIAP	Queensland
Matthew Fensom	Grower, Mushroom SIAP	New South Wales
Kyle Davies	Grower, Mushroom SIAP	Queensland
Neil Newman	Grower	Queensland
Steven Willemse	Grower	Queensland
Ian Chu	Grower	New South Wales
Geoff Izzard	Grower	Victoria



## APPENDIX 4: Reference material

Australian Fresh Produce Alliance, 2019, Growing a Healthier Australia: The Fresh Produce Industry Roadmap From \$9 billion to \$20 billion in 2030, White Paper 2019

Australian Mushroom Growers Association, 2021, <https://australianmushroomgrowers.com.au/>

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Horticulture Innovation Australia Limited, 2020, Australian Horticulture Statistics Handbook 2019/20

Horticulture Innovation Australia Limited, 2021, Australian-grown Horticulture Sustainability Framework

The Nielsen Company, 2021, Harvest to Home: Mushrooms,

<https://www.harvesttohome.net.au/fruitmushroomnuts/who-is-buying/mushrooms>

## APPENDIX 5: List of acronyms

<b>AFPA</b>	Australian Fresh Produce Alliance
<b>AIP</b>	Annual Investment Plan
<b>AMGA</b>	Australian Mushroom Growers' Association
<b>APVMA</b>	Australian Pesticides and Veterinary Medicines Authority
<b>BMP</b>	best management practice
<b>CPI</b>	consumer price index
<b>CSIRO</b>	Commonwealth Scientific and Industrial Research Organisation
<b>FY</b>	financial year
<b>GI</b>	glycemic index
<b>IA-CEPA</b>	Indonesia Australia Comprehensive Economic Partnership Agreement
<b>IPDM</b>	integrated disease and pest management
<b>IPM</b>	integrated pest management
<b>IRB</b>	Industry Representative Body
<b>KASA</b>	knowledge, attitudes, skills and aspirations
<b>KPI</b>	key performance indicator
<b>M&amp;E</b>	monitoring and evaluation
<b>MRL</b>	Maximum Residue Limit
<b>NHRN</b>	National Horticulture Research Network
<b>PHA</b>	Plant Health Australia
<b>R&amp;D</b>	research and development
<b>RDC</b>	Research and Development Corporation
<b>RD&amp;E</b>	research, development and extension
<b>SARP</b>	Strategic Agrichemical Review Process
<b>SIAP</b>	Strategic Investment Advisory Panel
<b>SIP</b>	Strategic Investment Plan
<b>SWOT</b>	strengths, weaknesses, opportunities and threats

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