

Macadamia

Strategic Investment Plan

2022-2026



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EXECUTIVE SUMMARY

The overarching strategic intent of this Strategic Investment Plan (SIP) is to drive the profitability and sustainability of the Australian macadamia industry by focusing on increasing demand in export markets, while innovating to improve efficiency of supplying the demand from domestic and overseas consumer markets.

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

The Australian macadamia industry situation in 2019/20 is described on **page 4** with further information provided in **Appendix 1**. The industry has expanded significantly over the past four years from 19,000 hectares of macadamia tree plantings in 2017 to present plantings of approximately 33,000 hectares, with greatest growth in and around the Bundaberg region of Queensland and the majority of holdings being medium to large operations. The Northern Rivers region of New South Wales consists mainly of older orchards on small to medium holdings with some new plantings undertaken on green field sites.

The strategic intent of the macadamia SIP provides a summary of how the macadamia industry will drive change over the life of the SIP. This will be ultimately come about through innovation and access to the tools required to increase productivity and meet the demands of consumers, both domestically and internationally.

The financial estimates give an indicative overview of the funding availability for the period of FY2022-FY2026.

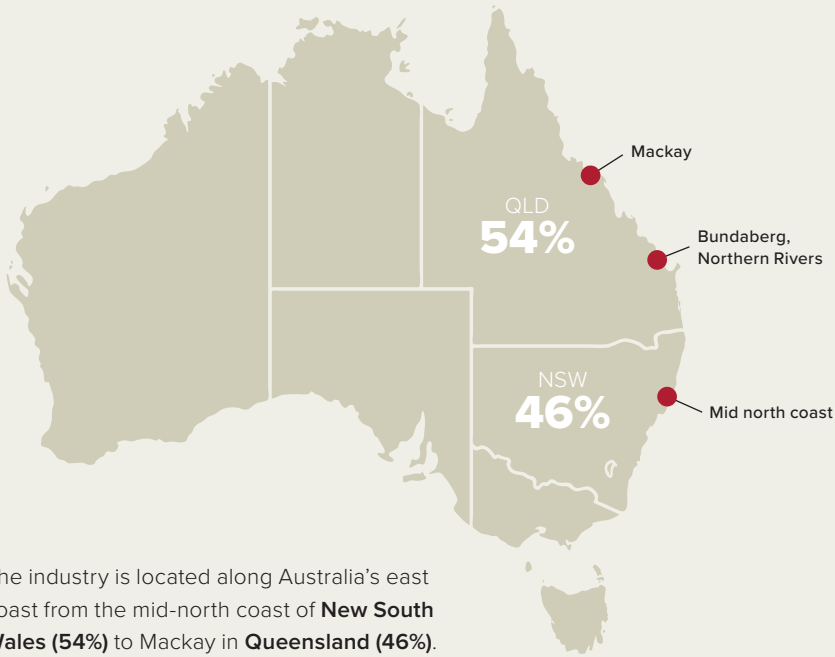
Although a major portion of the macadamia research and development (R&D) fund is currently allocated to key projects, available funds for investment will increase over the life of the SIP due to current projects concluding. Careful prioritisation of future investment needs will be required when the funds to invest become available in FY2023.

The four outcome areas found within this SIP cover significant themes under which programs and investments will be focused. These are listed in priority order for the macadamia industry. Demand creation continues to be a high priority for the industry as it continues to expand with a focus on international trade. Under the outcome of productivity, best management practice, nut quality and pest and disease management cover priority areas. Extension and communication of information, particularly from these priority areas will be key to the industry's success. Water continues to be a valuable commodity, in particular within the Bundaberg region with competing fruit and vegetable crops.

The key performance indicators (KPIs) detail how the impact of each strategy will be measured, for example, increased awareness of the macadamia brand, export growth to meet production expansion, new knowledge, tools and technical support for new emerging technologies and access to new varieties.

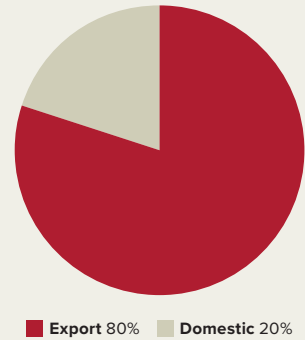


PRODUCTION AREAS:



The industry is located along Australia's east coast from the mid-north coast of **New South Wales (54%)** to Mackay in **Queensland (46%)**.

EXPORT/DOMESTIC:



PRODUCTION AREA:



25,000 hectares

(bearing) in 2019/20

Source: Australian Macadamia Society 2021

PRODUCTION WINDOW:



Feb-Sep

NUMBER OF GROWERS:



Approx. **800**

PER CAPITA CONSUMPTION:



0.19 kg

PRODUCTION VOLUME:



50,300 tonnes

(nut in shell at 10% moisture) in 2019/20

Source: Australian Macadamia Society 2021

FARMGATE VALUE:



\$334 million

in 2019/20

Source: Australian Macadamia Society 2021

GROWTH TRENDS:



SINCE 2012/13...

PRODUCTION VALUE GREW BY +\$229M



Production value has **more than doubled** since 2012/13.

THE MACADAMIA STRATEGIC INVESTMENT PLAN

The macadamia SIP is the roadmap that will guide Hort Innovation's oversight and management of the macadamia 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 macadamia industry priorities.

Hort Innovation has led the process for preparing the refresh of the macadamia 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 recent SIP, and environmental scanning to identify emergent trends and issues that could impact on future industry profitability and sustainability.

Hort Innovation has valued the support, advice, time, and commitment of all stakeholders that contributed to producing this SIP, especially macadamia 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 macadamia 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 macadamia 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 macadamia Strategic Investment Panel (SIAP), IRBs and other key stakeholders

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

Producers in the macadamia 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 macadamias 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 is set at 8.57 cents per kilogram of dried kernel and the marketing levy is set at 16.01 cents per kilogram of dried kernel.

Hort Innovation manages the macadamia levy funds proportion directed to R&D and marketing, while separately there is an Emergency Plant Pest Response (EPPR) charge of 0.20 cents per kilogram and 0.63 cents per kilogram for the National Residue Testing program.

Hort Innovation has developed this SIP for the macadamia industry to strategically invest the collected macadamia levy funds into the priority areas identified and agreed by the macadamia industry.

This plan represents the Australian macadamia industry's collective view of its R&D and marketing needs over the next five years (2022-2026). The plan has leveraged the learning and achievements from the past plan and been developed in consultation with Australian macadamia levy payers, combined with analysis of the previous SIP and synthesis of various strategic documents. **Appendix 1** 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 2**. A list of acronyms used within the document is available in **Appendix 3**.

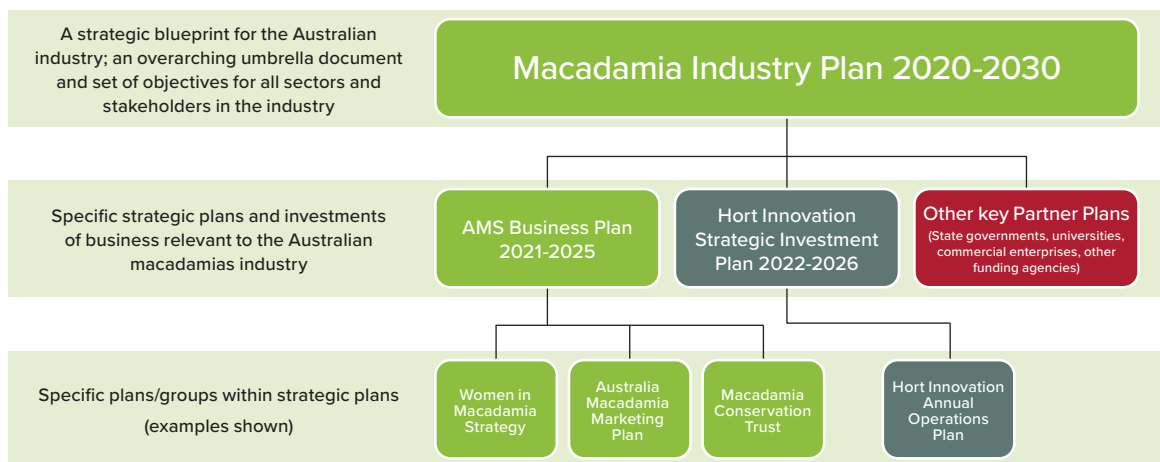
Planning for the future – alignment of industry plans and resources

There are a number of key stakeholder organisations that support and fund the Australian macadamia industry, along with the growers and processors that are the heart of the industry.

The Australian Macadamia Society (AMS) is the peak body for the industry and has a strong membership base representing growers, processors, and other service providers to the industry. Consequently, AMS plays many roles in supporting the development and overall wellbeing of the industry.

As such, AMS is the natural custodian of an overarching strategic blueprint, the Macadamia Industry Plan (MIP) 2020-2030 (Figure 1). This document was developed to inform, guide, and influence the direction and plans of key industry partners over the next decade, so that their investments and actions align and provide the best potential for the Australian macadamia industry to remain strong, united, and profitable.

FIGURE 2. Macadamia Industry Plan 2020-2030



The MIP 2020-2030 recognises the essential role of the many partner businesses and organisations that seek to support the development of the industry. As such, there are a number of subordinate plans that are integral to the blueprint and success of the industry, including:

- The Hort Innovation macadamia Strategic Investment Plan 2022-2026
- Plans of other industry partners, such as state governments, universities, commercial entities which make up the industry and other funding bodies
- AMS Strategic Business Plan.

The AMS, as a member-focused business, is responsible for its own Strategic Business Plan, which captures its purpose, business objectives, core functions and key financials. It is also closely aligned to the overarching MIP 2020-2030.

As custodian of the MIP 2020-2030, the AMS is always seeking feedback on how it may be improved and will regularly review its objectives and strategies to account for the dynamic business environment in which the industry operates.



Financial estimates

The annual revenue from levy income and Australian Government contributions for eligible R&D set the overall budget parameters for the macadamia 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 macadamia SIP over the life of the macadamia SIP over the life of the SIP

	2022 \$	2023 \$	2024 \$	2025 \$	2026 \$
R&D					
Balance end FY2021	371,615				
Estimated levy funds (growers)	1,500,000	1,670,000	1,800,000	1,940,000	2,100,000
Australian Government contribution	1,422,764	1,451,800	1,495,354	1,608,595	1,081,301
Current investments	2,200,000	2,100,000	2,075,000	2,270,000	1,062,000
New investments	250,000	400,000	500,000	500,000	800,000
Total project investments	2,450,000	2,500,000	2,575,000	2,770,000	1,862,000
CCR	395,528	403,600	415,708	447,189	300,602
Projected end balance	420,000	450,000	460,000	525,000	1,300,000
MARKETING					
Balance end FY2021	298,576				
Estimated levy funds (growers)	2,900,000	3,000,000	3,000,000	3,300,000	3,500,000
Current investments	2,200,000	500,000	800,000	400,000	400,000
New investments	250,000	1,980,000	1,900,000	2,400,000	2,400,000
Total project investments	2,450,000	2,480,000	2,700,000	2,800,000	2,800,000
CCR	398,837	403,721	439,535	455,814	455,814
Projected end balance	400,000	595,000	400,000	580,000	760,000

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



MACADAMIA INDUSTRY OUTCOMES

The overarching strategic intent of this SIP is to drive the profitability and sustainability of the Australian macadamia industry by focusing on increasing demand in export markets, while innovating to improve efficiency of supplying the demand from domestic and overseas consumer markets.

Industry outcomes

Outcome statements as identified and prioritised by the macadamia 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

Grow consumer demand in domestic and international markets to support farmgate grower returns.

Demand creation will support industry to expand into existing and future domestic and international markets. This will be supported by increased consumer knowledge, attitudes to drive growth in category volume.

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

- Broaden consumer awareness so that macadamias are more top of mind and purchased more frequently
- Support product positioning with consistent quality, evidence of beneficial product health attributes and responsible industry production practices
- Develop strong relationships across the supply chain with a shared goal to grow the category
- Identify and prioritise export and domestic market niches where there is demand and growth potential for competitive supply of quality Australian macadamias.

“The important function of this SIP is to ensure that the investment decisions align with macadamia industry priorities.”

OUTCOME 2: Industry supply, productivity and sustainability

Improve industry productivity (inputs/outputs) to maintain local and international competitiveness, while maintaining viability and sustainability of supply.

Supply and productivity will be supported through improvements to production efficiencies which 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:

- Developing new genetics and trait improvement via breeding to support the development of elite scion varieties
- Increasing resource use efficiency through new knowledge and tools to better understand physiology requirements for optimum nut set, and abscission in integrated orchard management
- Developing new systems for orchard intensification including tree size and architecture
- Establishing a sustainability strategy in partnership with the macadamia industry
- Identifying future R&D opportunities to improve quality through the supply chain
- Addressing key economic, social and environmental outcomes through an integrated approach to pest and disease management
- Securing pollination for industry through robust honey bee health, pest and disease mitigation and investigation of alternate pollinators
- 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.

Build capability that enables adoption across the supply chain of best practices and innovation supporting an innovative culture.

The strategic intent of this outcome is to manage information, and develop relationships, to assist in increasing adoption of best practices and innovations which increases productivity and sustainability. Achieving the outcome will involve:

- A change in knowledge and skill leading to adoption of best practice and innovation
- Maintaining and improving industry cohesiveness, through engagement along the supply chain in macadamia investments
- Growers, supply chain, the general public and governments being well informed on industry initiatives and achievements as a vital part of regional communities and networks
- Improved networks and cross-industry collaboration which increase the use by industry of investment outputs to build a stronger, more resilient industry
- Offering leadership skills and knowledge to growers that increases confidence and encourages the take up of positions of responsibility in business and industry supporting a sustainable industry.

OUTCOME 4: Business insights

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

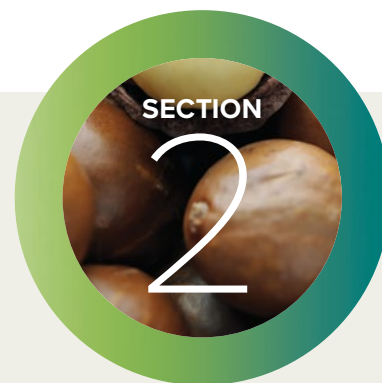
Business insights will support the industry to remain aware of market and industry trends to drive informed decision-making.

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 to enable better decision-making process by industry and individual businesses.

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

MACADAMIA 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 macadamia industry to develop existing and future domestic and international markets.

STRATEGIES	POTENTIAL BENEFIT OR IMPACT
1. Develop trade with new and established export markets	<ul style="list-style-type: none"> Increased exports and demand Maintained and/or improved market access Establishment and maintenance of collaborations with other nut origins and industries to expand trade
2. Increase domestic and international demand for Australian macadamias through improving knowledge, attitudes and purchase intent	<ul style="list-style-type: none"> Increased consumer demand for Australian macadamias Clearly defined and documented sustainability position for the industry
3. Utilise and further build the 'Australian Macadamias' brand to deliver all communications	<ul style="list-style-type: none"> Increased consumer awareness of the 'Australian Macadamias' brand Market leadership demonstrated through awareness and alignment with 'Australian Macadamias' campaign activity
4. Develop, publish, promote and distribute information for food manufacturers in key target markets that promote the use of macadamias as an ingredient and inspire innovation	<ul style="list-style-type: none"> Innovation with macadamia products by food manufacturers and promotion of this to consumers



OUTCOME 2: Industry supply, productivity and sustainability

The Australian macadamia industry has increased profitability, efficiency and sustainability through innovative R&D and sustainable BMPs.

STRATEGIES	POTENTIAL BENEFIT OR IMPACT
1. Increase resource use efficiency (water, nutrients) through better understand of physiology requirements for optimum nut set, and abscission in integrated orchard management	<ul style="list-style-type: none"> • New tools and knowledge that drive sustainable, productive and profitable orchard systems
2. Develop new genetics and trait improvements via breeding to support the development of elite scion varieties	<ul style="list-style-type: none"> • Resilient, sustainable production systems that support demand creation
3. Develop new systems for orchard intensification including tree size and architecture	<ul style="list-style-type: none"> • Improved understanding of physiology requirements for optimum nut set, retention and abscission • Availability of early maturing varieties suited to current and future orchard systems • Improvement in production quality and yield through informed and targeted use of water, nutrition and sunlight
4. Adapt the Australian-grown Horticulture Sustainability Framework to align with the macadamia industry priorities and establish a data baseline	<ul style="list-style-type: none"> • Establishment of a sustainability baseline and targets for the macadamia industry • Identification of the sustainability measures which are most relevant to macadamia consumers and communities
5. Identify stages in the supply chain (pre- and post-farmgate) where quality is impacted to inform future R&D and development of BMPs	<ul style="list-style-type: none"> • Establishment of a strategic competitive advantage over other nut origins in markets that value premium quality • Consistent high-quality macadamias for consumers and new product development • Quality assessment technology is integrated into supply chain BMPs • Decreased incidence of kernel browning in macadamias
6. Support an integrated pest and disease management (IPDM) program that addresses key economic, social and environmental outcomes for the macadamia industry	<ul style="list-style-type: none"> • Increased biodiversity and improved environmental resilience through evidence-based stewardship • Economic analysis supports adoption IPDM practices • Crop loss reduced by sustainable pest and disease practices • Reduced risk of biosecurity incursions
7. Prioritise the major crop protection gaps through a Strategic Agrichemical Review Process (SARP)*	<ul style="list-style-type: none"> • 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
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"> • Regulatory Risk Assessments have informed proactive strategic priority setting to avoid pest management gaps in the event that access or use is negatively impacted
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"> • Crop protection solutions meet industry priority needs as identified in the industry SARP or biosecurity plan
10. Collaborate with other horticulture industries to undertake research into clonal rootstock propagation	<ul style="list-style-type: none"> • Cross-industry opportunities improve efficiencies and learning

Continued >>

OUTCOME 2: Industry supply, productivity and sustainability

The Australian macadamia industry has increased profitability, efficiency and sustainability through innovative R&D and sustainable BMPs.

STRATEGIES	POTENTIAL BENEFIT OR IMPACT
11. Enhance crop pollination and resilience through improved pollination security	<ul style="list-style-type: none"> Provision of support for pollination security through robust honey bee health, pest and disease mitigation and investigation of alternate crop pollination solutions Continued access to honey bees for pollination Optimal placement and management of honey bee hives and of compatible cultivars identified in collaboration with growers

OUTCOME 3: Extension and capability

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

STRATEGIES	POTENTIAL BENEFIT OR IMPACT
1. Deliver communication and extension capability in the areas of sustainable production, pest and disease management, pollination, orchard management biosecurity and trade development	<ul style="list-style-type: none"> A progression in awareness, knowledge and skills for grower profitability and sustainability which supports the adoption of best management practice, emerging technologies and innovations
2. Provide opportunity for growers to learn from each other through networking and developing collaborations between industry members and across industries (e.g., tree crops) to identify shared challenges and solutions	<ul style="list-style-type: none"> Increased skills and knowledge leading to implementation of best practices and innovations
3. Strengthen industry leadership through initiatives and training	<ul style="list-style-type: none"> Increased skills, knowledge and confidence which encourages growers and employees to take up positions of responsibility throughout industry which assists in supporting a sustainable industry

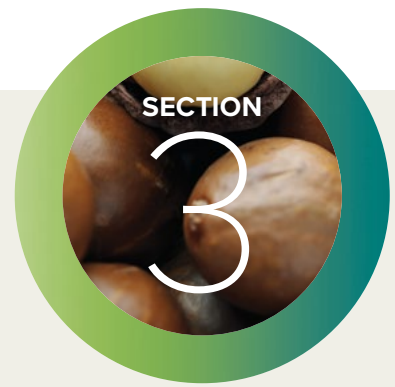
OUTCOME 4: Business insights

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

STRATEGIES	POTENTIAL BENEFIT OR IMPACT
1. Increase industry alignment with quality and brand-positioning opportunities driven by consumer insights*	<ul style="list-style-type: none"> Provision of business insights to deliver against demand, supply and extension outcomes
2. Use trade data to guide ongoing export development opportunities*	<ul style="list-style-type: none"> Increased knowledge of potential markets
3. Use industry production benchmarking activity to measure and track industry productivity and profitability and sustainability metrics, identifying areas for ongoing priority	<ul style="list-style-type: none"> Increased industry and grower capacity

* 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.



MACADAMIA SIP MONITORING AND EVALUATION

The macadamia 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.

Macadamia SIP Monitoring and Evaluation Framework

The macadamia SIP M&E Framework 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
Demand creation		
Outcome 1: Demand creation supports the Australian macadamia industry to expand into existing and future domestic and international markets.	1. Develop trade with new and established export markets	<ul style="list-style-type: none"> Growth in market share of existing priority export markets and growth of exports into new markets Maintenance of preference for premium for Australian-grown macadamias in key markets
	2. Increase domestic and international demand for Australian macadamias through improving knowledge, attitudes and purchase intent	<ul style="list-style-type: none"> Positive influence on consumer preference, knowledge, attitudes, and purchase intent Use of nutritional information to support consumer demand Increased breadth of new product opportunities supported by innovation in format and processing Improved understanding of consumer perceptions of quality for macadamias
	3. Utilise and further build the ‘Australian Macadamias’ brand to deliver all communications	<ul style="list-style-type: none"> Increased awareness of the ‘Australian Macadamias’ brand
	4. Develop, publish, promote and distribute information for food manufacturers in key target markets that promote the use of macadamias as an ingredient and inspire innovation	<ul style="list-style-type: none"> Collateral is valued by manufacturers with products developed and promoted Development and publishing of a sustainability report for the Australian macadamia industry

OUTCOME	STRATEGIES	KPIs
Supply, productivity and sustainability		
<p>Outcome 2: The Australian macadamia industry has improved profitability, efficiency and sustainability through innovative R&D, sustainable BMPs and varieties.</p>	<p>1. Increase resource use efficiency (water, nutrients) through better understand of physiology requirements for optimum nut set, and abscission in integrated orchard management</p>	<ul style="list-style-type: none"> • Availability of new knowledge to increase water and nutrient-use efficiency (ML/t nut-in-shell) • Availability of new knowledge on physiology requirements for optimum nut set, retention and abscission in integrated orchard management
	<p>2. Develop new genetics and trait improvements via breeding to support the development of elite scion varieties</p>	<ul style="list-style-type: none"> • Access to new scion varieties with improved productivity, resource-use efficiency, pest and disease resistance and orchard profitability • Access to new scion varieties suitable to high-density orchard systems • Access to new genetic knowledge and tools to support continued improvement of macadamia genetics • Availability of new knowledge for growers on the performance and profitability of new scion varieties (including comprehensive and grower-led Regional Variety Trial demonstration sites) • An arboretum with wild and cultivated macadamia trees in Alstonville and Tiaro maintained to support future farm productivity • Availability of new knowledge on the genetics, performance, and potential value of wild macadamia varieties
	<p>3. Develop new systems for orchard intensification including tree size and architecture</p>	<ul style="list-style-type: none"> • Availability of new knowledge and tools for growers to achieve enhanced profitability and farm productivity of current production systems • Availability of new knowledge and tools for growers to develop next generation orchard systems to achieve yields greater than 4 tonnes per hectare (nut-in-shell)
	<p>4. Adapt the Australian-grown Horticulture Sustainability Framework to align with the macadamia industry priorities and establish a data baseline</p>	<ul style="list-style-type: none"> • Availability of a sustainability framework for macadamias • Establishment of baseline data and evidence on identified sustainability topics • Increased knowledge of sustainability topics supporting alignment of growing practices
	<p>5. Identify stages in the supply chain (pre- and post-farmgate) where quality is impacted to inform future R&D and development of BMPs</p>	<ul style="list-style-type: none"> • Availability of new knowledge for growers to increase nutrient use efficiently (nutrient input/ nut-in-shell) • Greater clarity on specific focus areas for quality improvement within the supply chain • Identification of technological advances in monitoring product quality in similar industries

Continued >>

OUTCOME	STRATEGIES	KPIs
Supply, productivity and sustainability		
<p>Outcome 2: The Australian macadamia industry has improved profitability, efficiency and sustainability through innovative R&D, sustainable BMPs and varieties.</p>	<p>6. Support an IPDM program that addresses key economic, social and environmental outcomes for the macadamia industry</p>	<ul style="list-style-type: none"> • Maintenance/tracking of the implementation of an industry biosecurity plan • Increased adoption of IPDM strategies • Reduction in crop loss from fruitspotting bug, Botryosphaeria and other major pests and diseases • Industry informed on the causes of brown centre/kernel browning and mitigation options • Review of macadamia supply chain to understand impact and causes of inferior macadamia quality • Development of technologies to predict shelf life
	<p>7. Prioritise the major crop protection gaps through a SARP*</p>	<ul style="list-style-type: none"> • Coordinated industry priority setting with a clear outlook of gaps and risks in existing pest control options • Industry priority needs published and shared with stakeholders, including registrants
	<p>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*</p>	<ul style="list-style-type: none"> • Regulatory Risk Assessments maintained
	<p>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*</p>	<ul style="list-style-type: none"> • Data to support applications to the APVMA and the establishment of Maximum Residue Limits
	<p>10. Collaborate with other horticulture industries to undertake research into clonal rootstock propagation</p>	<ul style="list-style-type: none"> • New collaborations that drive knowledge on clonal propagation for rootstocks • Availability of new knowledge on the genetics, performance, and potential conservation value of wild macadamia varieties
	<p>11. Enhance crop pollination and resilience though improved pollination security</p>	<ul style="list-style-type: none"> • Alternative and mechanical pollinators identified in collaboration with growers



OUTCOME	STRATEGIES	KPIs
Extension and capability		
Outcome 3: Improved capability and an innovative culture in the Australian macadamia industry maximises adoption of investments in productivity and demand.	1. Deliver communication and extension capability in the areas of sustainable production, pest and disease management, pollination, orchard management biosecurity and trade development	<ul style="list-style-type: none"> Establishment of a baseline and then increased share of industry (in hectares) with positive change in knowledge, attitude, skills, aspirations (KASA) and practices concerning targeted high-priority areas
	2. Provide opportunity for growers to learn from each other through networking and developing collaborations between industry members and across industries (tree crops) to identify shared challenges and solutions	<ul style="list-style-type: none"> Grower satisfaction with growth in cooperation within industry and across industries leading to business and industry innovations (e.g., survey data)
	3. Strengthen industry leadership through initiatives and training	<ul style="list-style-type: none"> Increased participation in industry leadership initiatives
Business insights		
Outcome 4: The Australian macadamia industry is more profitable through informed decision-making using consumer knowledge and tracking, trade data, production statistics and independent reviews.	1. Increase industry alignment with quality and brand-positioning opportunities driven by consumer insights*	<ul style="list-style-type: none"> Provision of business insights to deliver against demand, supply and extension outcomes
	2. Use trade data to guide ongoing export development opportunities*	<ul style="list-style-type: none"> Trade data maintained and data outputs supplied to meet stakeholder needs
	3. Use industry production benchmarking activity to measure and track industry productivity and profitability and sustainability metrics, identifying areas for ongoing priority	<ul style="list-style-type: none"> Availability of data to support extension activities and individual grower decision-making Evidence of data used to support industry-level decision-making and grower practice change

* 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.

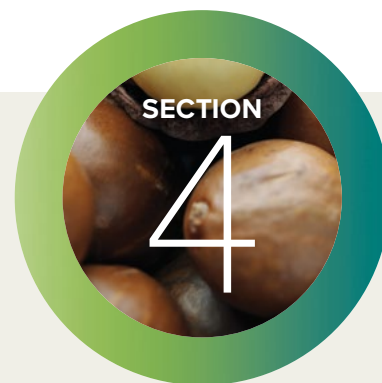
Reporting framework

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 macadamia 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](#).



INDUSTRY CONTEXT

Industry supply chain

The macadamia industry is located along Australia’s east coast, from the mid-north coast of New South Wales up to Atherton Tablelands in Queensland. Production is concentrated in the Northern Rivers region of New South Wales and Bundaberg in Queensland. There are a small number of macadamia growers in Western Australia.

New production is expanding in Queensland at Emerald (single large planting) and Bundaberg, with another significant expansion around the Clarence River in northern New South Wales on land previously used for growing sugarcane. As Bundaberg plantings begin to mature, production volumes will increase (source: industry consultation).

In historical terms, current prices are high, but some price correction is anticipated as world supply increases.

Macadamia growers sell directly to processors or in-shell handlers who take the product and dry it. The product is either sold as nut-in-shell or cracked to produce kernel. Nut-in-shell handlers and processors manage over 95% of macadamias produced in Australia. There are 12 Australian macadamia processors/handlers.

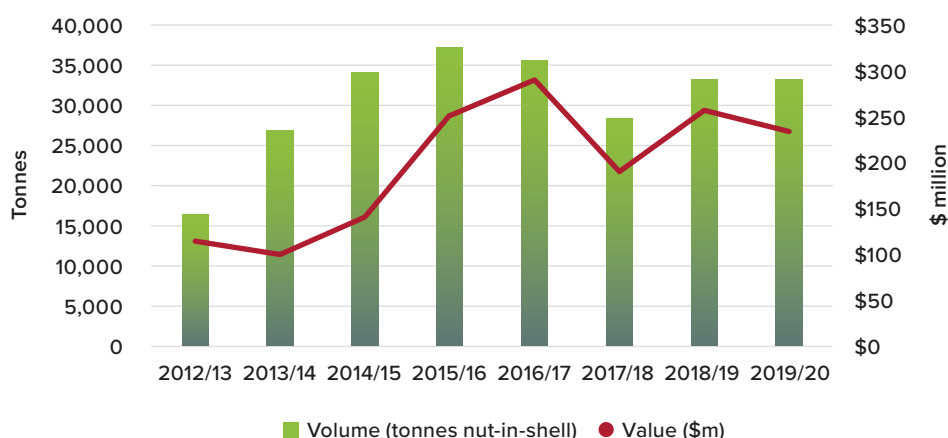
Secondary marketers include businesses that repackage under proprietary or private label brands; businesses and manufacturers that change the product’s form, including packaged food products, such as cereal, confectionary, and ice cream; and retailers who range all types of products, including macadamia nuts.

Domestic consumers and drivers of demand

A healthy and versatile product, macadamia nuts are found in up to seven Australian supermarket aisles. Health authorities worldwide recommend daily consumption of nuts of up to 30 grams a day.

Export markets

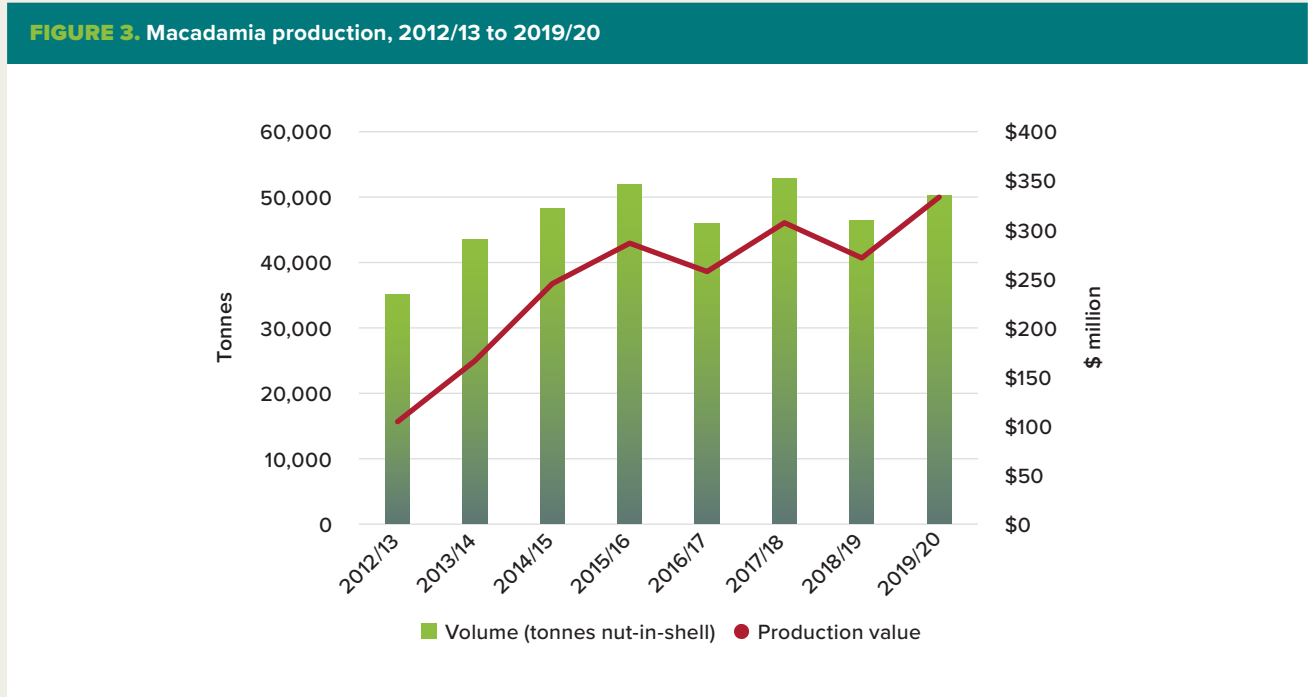
FIGURE 2. Macadamia exports, 2012/13 to 2019/20



Source: Australian Horticulture Statistics Handbook (2019/20)

The Australian macadamia industry has benefited from a sound export-focused growth program, with exports currently making up 80% of production by volume. The main export partners in 2019/20 were China (28%), Japan (11%), Korea (5%), the USA (4%), and Germany (4%).

Industry production



Source: Australian Macadamia Society (2021)

The macadamia industry production volumes have fluctuated over recent years, impacted by challenging seasonal conditions. While peak volume was recorded at 52,900 tonnes in shell in 2018, the industry achieved its highest value in 2020, following high market prices (Figure 3). Production volumes are expected to rise as more trees come into production over the short term.



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

Macadamia 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. The outcome and ultimate impact of the pandemic are unknown. Investment areas 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 have 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 whole 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 2 has been used to analyse the macadamia 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 2. Macadamia SWOT analysis

The macadamia industry	
Strengths	<ul style="list-style-type: none"> • An industry that is profitable and confident about the future, with improving productivity and scope for more gains • Willing to trial new technologies, an integrated pest management (IPM) culture, and flat land suitable for mechanisation (e.g., Bundaberg) • The home of wild macadamia germplasm from which to draw gene stock for commercial varieties • A product positioned in the marketplace to attract a price premium, compared to other nuts • An industry that services multiple high-value markets and is not dependent on any single destination, including the Australian domestic market, which is highly concentrated at retail • An industry that collaborates to achieve on-farm efficiencies and international market success. Primary marketers in the commercial sector are engaged with the levy-funded marketing program • Decision making backed by timely and accurate production forecast and marketing data • A reputation for providing consistently superior macadamias and meeting supply obligations • Internationally recognised and trusted food standards, including chemical residue testing • Australian macadamia industry has a well organised industry driven, collaborative R&D program that is addressing key issues affecting farm productivity and nut quality
Weaknesses	<ul style="list-style-type: none"> • High cost of production relative to macadamias grown in other countries • Geographic concentration – vulnerable to climatic events and pest incursion • A shortage of supply restricted new product innovation • Production in what are now peri-urban areas, which has implications for farm expansion and farm operation, • Historically, the industry has been hit by 'confidence-zapping' price collapses (1990, 2000, 2007) • Global macadamia kernel consumption is concentrated in six key markets – the USA, Europe (primarily Germany), Australia, Japan, Korea and Brazil – and while these markets are large, a change in access could affect total sales

The macadamia industry	
Opportunities	<ul style="list-style-type: none"> • Average productivity is well below that of industry leaders • Identify and exploit other market opportunities – countries, segments, products – in line with an agreed marketing plan and available funds. Most countries have low per capita macadamia consumption; macadamias account for less than one per cent of world nut supply (less than 2% of tree nuts) • Food manufacturers who have been reluctant to commit to new macadamia-based products due to concerns about adequate, consistent supply can be encouraged by additional availability • Achieving a critical mass of product is key to macadamia industry success: lower processing costs, which in turn attract corporate investment in production, and attract food manufacturers • International collaboration to generate better information and a collective understanding of R&D and marketing challenges and possible solutions • Adoption of new technologies to improve harvest efficiency, monitoring, sensor technology, yield mapping and automation to improve productivity
Threats	<ul style="list-style-type: none"> • Demand presently outstrips supply, putting upward pressure on macadamia prices. Whether current prices can be maintained over the life of this plan will depend on many things, including exchange rates, the success of this plan and its implementation, and the extent to which the global industry takes a coordinated approach to demand stimulation • Major increase in world production after 2018, especially from suppliers including South Africa, Kenya and China (but South Africa is buying harvest machinery – a sign that its labour costs/total costs are rising) • It is essential that the Australian industry avoids the ‘commoditisation trap’, that consumers and trade buyers continue to perceive Australian macadamias as a premium product • Ageing research population and the lack of succession planning and mentoring • Abnormal vertical growth leading to orchard replacement and reduction of production • Availability and quality of water supply, particularly in Bundaberg region • Fruitspotting bug





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 research, development and extension (RD&E), marketing and international 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 macadamia industry include:

- Opportunities to support export markets
- Export supply chain pathways (new way of doing business)
- Quality monitoring and capacity building across the supply chain
- Leadership initiatives
- Food safety.

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

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. 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. The lead agency involved with the macadamia industry investment program, Department of Agriculture and Fisheries, Queensland (DAFQ), was engaged during the development of this SIP to ensure consideration and strategically aligned priorities for the macadamia industry. In addition, strategic priorities and opportunities identified by AMS have been considered in the development of the macadamia SIP where applicable.

TABLE 3. Government and key agency priorities

AMS strategic priorities	DAFQ priorities	Rural RD&E for Profit priorities	Australian Government Science and Research priorities
Demand ahead of supply	Improved varieties and rootstocks	Advanced technology	Food
Adopt innovative and sustainable practices and technologies	Impacts of climate change/sustainable production	Biosecurity	Soil and water
Orchard productivity doubled to 6t/ha nut-in-shell	Future production systems/orchard management	Soil, water and managing natural resources	Advanced manufacturing
Develop quality people in all sectors	IPDM	Adoption of R&D	Environmental change
Maintain a strong unified industry with visionary leadership			Health

This SIP has been developed alongside the government and key agency priorities listed in **Table 3**, with consideration of issues faced by the macadamia 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 macadamia 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 macadamia 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 initiative.

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

- Health, nutrition and food safety
- International markets
- Leadership.

Partnering with Hort Frontiers on these areas would provide the macadamia 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 4*).



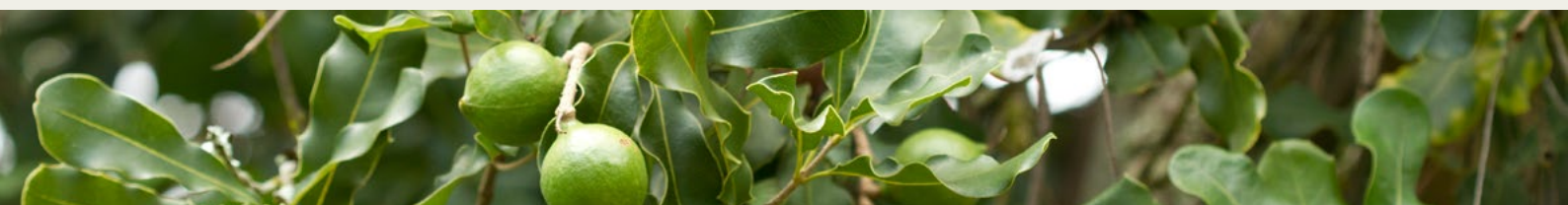
The framework should be cross-referenced when undertaking prioritisation of investments. At the time of publication, Hort Innovation is working with industry groups regarding the overall responsibility for the framework, setting and reporting progress against the framework targets and performance measures.

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

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

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

STRATEGY	POTENTIAL BENEFIT AND IMPACT	SUSTAINABILITY GOAL
Adapt the Australian-grown Horticulture Sustainability Framework to align with the macadamia industry priorities and establish a data baseline	<ul style="list-style-type: none"> Establishment of a sustainability baseline and targets for the macadamia industry Identification of the sustainability measures which are most relevant to macadamia consumers and communities 	All
Increase domestic and international demand for Australian macadamias through improving knowledge, attitudes and purchase intent	<ul style="list-style-type: none"> Increased consumer demand for Australian macadamias Clearly defined and documented sustainability position for the industry 	People & Enterprise
Develop trade with new and established export markets	<ul style="list-style-type: none"> Increased exports and demand Maintained and/or improved market access Establishment and maintenance of collaborations with other nut origins and industries to expand trade 	People & Enterprise
Increase resource use efficiency (water, nutrients) through better understand of physiology requirements for optimum nut set, and abscission in integrated orchard management	<ul style="list-style-type: none"> New tools and knowledge that drive sustainable, productive and profitable orchard systems Resilient, sustainable production systems that support demand creation Improved understanding of physiology requirements for optimum nut set, retention and abscission Availability of early maturing varieties suited to current and future orchard systems Improvement in production quality and yield through informed and targeted use of water, nutrition and sunlight 	Planet & Resources
Support an IPDM program that addresses key economic, social and environmental outcomes for the macadamia industry	<ul style="list-style-type: none"> Increased biodiversity and improved environmental resilience through evidence-based stewardship Economic analysis supports adoption IPDM practices Crop loss reduced by sustainable pest and disease practices Reduced risk of biosecurity incursions 	Planet & Resources



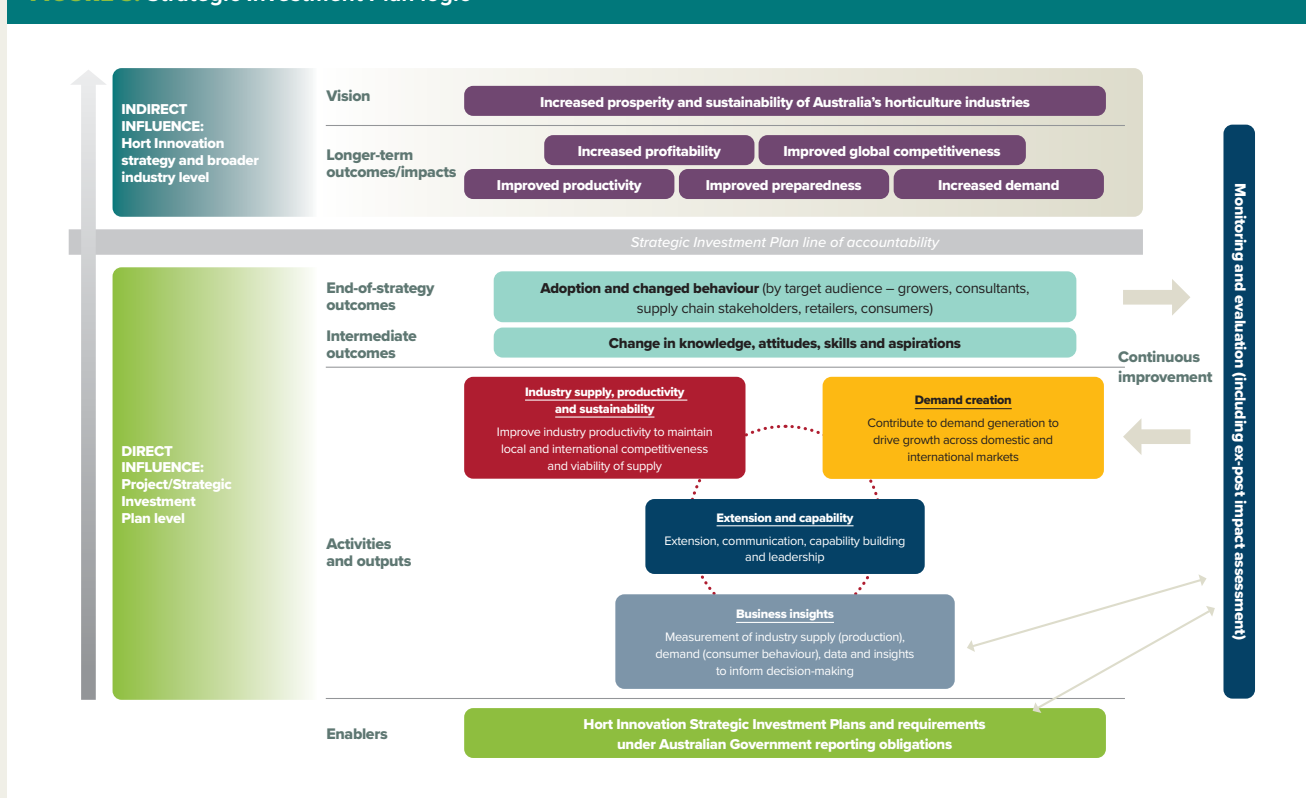
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Strategic Investment Plan logic

The Strategic Investment Plan logic (**Figure 5**) identifies how investment activities and outputs (delivered through each SIP outcome area) will support changes in industry knowledge, skills, attitudes, and aspirations, 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 5. 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 contributions 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: People consulted

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

NAME	INDUSTRY ROLE	REGION
Chris Cook	Grower	New South Wales
Daniel Tranter	Grower	Queensland
John Vaughan	Grower	Queensland
Jon Perrin	Processor; Consultant	New South Wales
Larry McHugh	Processor	New South Wales
Paul Moosberger	Processor; Consultant	New South Wales
Richard Ray	Processor; Consultant	New South Wales
Scott Allcott	Grower	Queensland
Andrew Pearce	Processor; Consultant	Queensland
Chris Searle	Grower; Consultant	Queensland
Henrik Christiansen	Grower	Queensland
Jolyon Burnett	CEO, Australian Macadamia Society	New South Wales
Lindsay Bryen	Grower	New South Wales
Paul O'Hare	Chair, Macadamia Conservation Trust	Queensland
Shane Mulo	Researcher	Queensland
Tim Salmon	Grower	Queensland
Jacqui Price	Marketing Manager, Australian Macadamia Society	Queensland
Aimee Thomas	Director, Australian Macadamia Society; Grower	Queensland
Craig Mills	Director, Australian Macadamia Society; Grower	New South Wales
Graeme Fleming	Director, Australian Macadamia Society; Grower	New South Wales
Michael Russo	Director, Australian Macadamia Society; Grower	Queensland
Trevor Steinhardt	Director, Australian Macadamia Society; Grower	Queensland
John Wilkie	Researcher	Queensland
Leoni Kojetin	Industry Development Officer, Australian Macadamia Society	Queensland
Michael McMahon	Director, Australian Macadamia Society; Grower	Queensland



APPENDIX 2: Reference material

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APPENDIX 3: List of acronyms

AIP	Annual Investment Plan
AMS	Australian Macadamia Society
APVMA	Australian Pesticides and Veterinary Medicines Authority
BMP	best management practice
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DAFQ	Department of Agriculture and Fisheries, Queensland
EPPR	Emergency Plant Pest Response
FY	financial year
GI	glycemic index
IRB	Industry Representative Body
IPDM	integrated pest and disease management
IPM	integrated pest management
KASA	knowledge, attitudes, skills and aspirations
KPI	key performance indicator
MIP	Macadamia Industry Plan
M&E	monitoring and evaluation
NHRN	National Horticulture Research Network
PHA	Plant Health Australia
R&D	research and development
RDC	Research and Development Corporation
RD&E	research, development and extension
SARP	Strategic Agrichemical Review Process
SIAP	Strategic Investment Advisory Panel
SIP	Strategic Investment Plan
SWOT	strengths, weaknesses, opportunities and threats



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