

Macadamia

STRATEGIC INVESTMENT PLAN

2017-2021



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Introduction

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

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

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

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

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

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

The macadamia SIP

Producers in the macadamia industry pay levies to the Department of Agriculture and Water Resources (DAWR), 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 macadamia that are produced in Australia and either sold by the producer or used by the producer in the production of other goods. The levy rate on macadamia is 25.21 cents per kilogram of sale-able kernel.

Hort Innovation manages the proportion of macadamia levy funds directed to R&D and marketing investments (24.58 cents per kilogram/kernel) while the DAWR manages the proportion of levy funds directed to National Residue Survey (NRS) residue-monitoring programs (0.63 cents per kilogram). In 2015/16, total macadamia levy receipts were approximately \$3.95 million; \$1.38 million of R&D levies and \$2.57 million of marketing levies.

Hort Innovation has developed this SIP to assist in strategically investing the collected macadamia levy funds in the priority areas identified and agreed by the macadamia industry. The ability to successfully deliver on all the articulated strategies (and investments) will be determined by the statutory levy's ability to provide the resources to do so.

This plan represents the Australian macadamia industry's collective view of its R&D and marketing needs over the next five years (2017 to 2021). It has been developed in consultation with Australian macadamia levy payers in the following ways: careful consideration of the current SIP 2014 to 2019; synthesis of preplanning tailored for the macadamia industry; preparation that includes analysis and research of inputs for the strategy; execution to create the strategy; and validation, including the opportunity for levy payers to comment on the draft SIP.

The process used to develop this plan is described in **Appendix 1**. The people consulted in the preparation of the plan are listed in **Appendix 2**, and the documents referred to are listed in **Appendix 3**.

The macadamia SIAP has responsibility for providing strategic investment advice to Hort Innovation. Both Hort Innovation and the panel will be guided by the strategic investment priorities identified within this plan. For more information on the macadamia industry SIAP constituency, please visit Hort Innovation's website at www.horticulture.com.au.

Macadamia

STRATEGIC INVESTMENT PLAN 2017-2021 AT A GLANCE

POTENTIAL IMPACT OF THIS PLAN



Based on an estimated investment of \$24.2 million over the next five years

OUTCOMES	STRATEGIES
Increased productivity and grower returns through an average yield increase to five tonnes nut-in-shell per hectare by 2021 (equivalent to approximately 1.6 tonnes kernel per hectare – based on a SKR of 32%)	Reduce unsound kernel and nut-in-shell by further enhancing the industry's integrated pest management (IPM)
	Reduce unsound kernel and nut-in-shell by further enhancing the industry's integrated disease management (IDM)
	Complement IPM and IDM with a program of investment in chemical registration and renewal to ensure an appropriate suite of control measures
	Increase grower adoption of IPM and IDM
	Commit to long-term research to improve the understanding of the physiology of the macadamia, an Australian native with a relatively short history of domestication
	Improve harvest efficiency, and resultant nut capture
	Reduce harvest time to free up farm resources that improve farm productivity
	Reduce nut loss along the value chain
	Develop, agree and report objective measures of environmental sustainability

OUTCOMES	STRATEGIES
Improved production systems covering plant breeding, intensive orchards and novel technologies	Leverage past investment and continue to commit to a long-term effort to deliver a radically improved production system
	Develop novel technologies that facilitate improved production systems
	Incubate grower-inspired innovation for wider application in the macadamia industry
	Scan opportunities for novel technologies deployed in other tree crops, agricultural and non-agricultural sectors
Improved capacity to lead and support current and future industry needs	Continue to support adoption of R&D outputs by effective extension
	Deliver meaningful data on production, planting, environmental performance, international supply and demand in a timely manner
	Ensure industry stakeholders remain engaged through an effective communications program
	Enhance skills and capacity to support current and future industry needs
Market demand for Australian macadamias has increased and expanded	Develop a five-year marketing plan supported by annual operating plans with clear reporting criteria that meet Hort Innovation monitoring and evaluation requirements
	Develop a more complete world macadamia production forecast

Macadamia

STRATEGIC INVESTMENT PLAN

2017-2021 AT A GLANCE

OUTCOMES	STRATEGIES
Market demand for Australian macadamias has increased and expanded	Continue to curate, analyse and publish relevant market information and statistics through existing communication channels to support industry and commercial marketer decision making
	Develop and publish a compelling suite of information for food manufacturers that promotes the use of macadamias as an ingredient
	Actively promote and distribute compelling information on the use of macadamias as an ingredient to food manufacturers in key target markets
	Create a culture of innovation by demonstrating new ways to use macadamias
	Support food manufacturers with cost-effective, visible consumer promotion
	Utilise and further build the Australian macadamia brand to deliver all communications
	Facilitate and support connections and engagement with overseas macadamia industries and other nut industries

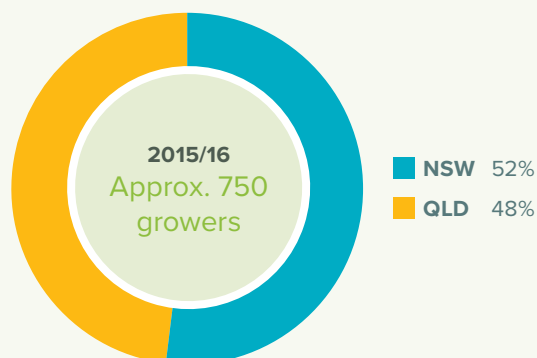
Major opportunities

- Scope to increase average yields
- An increase in global consumption of macadamias
- Ability to supply consistently
- Achieving a critical mass
- International collaboration
- Technological know-how
- Product innovation
- Demand outstrips supply

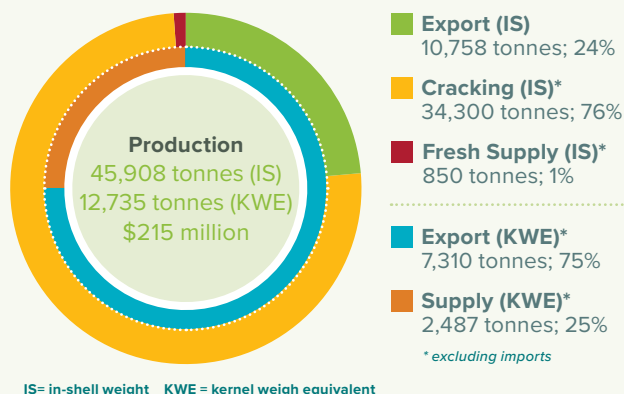
Major challenges

- High cost of production
- Geographic concentration and resulting climatic and pest incursion vulnerability
- Shortage of production
- Producing in per-urban areas
- Concentration of global macadamia consumption in six key markets
- World production increasing, especially in low-cost countries
- Avoiding the 'commoditisation trap'

Industry size and production distribution



Macadamia supply chain and value 2014/15



SECTION ONE

Context

The Australian macadamia industry

Growing regions and growers

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 New South Wales Northern Rivers and Bundaberg in Queensland. There are a small number of macadamia growers in Western Australia¹.

A new generation of growers has recently entered the Australian macadamia industry, some of which are producing at scale with new technology in newer production areas. Grower confidence has returned to the industry following low prices received in 1990, 2000, and again in 2007 (industry consultation).

Industry size and value

The Australian macadamia industry is a significant sector of the Australian horticultural industry, with about 750 businesses generating an annual gross value of production of \$215 million at farm-gate². The industry is valued at \$336 million at factory gate, and \$650 million at retail³. Six hundred growers are members of Australian Macadamia Society (AMS). The entire supply chain includes processors, investors, marketers, suppliers, consultants, researchers and administrators⁴.

Macadamia production

Australia currently produces about 30 per cent of the world's macadamia crop. Industry production has increased modestly from 43,900 tonnes nut-in-shell (NIS) at 10 per cent moisture content in 2006, to 52,000 tonnes NIS in

2016⁵. Much of this growth has been generated by increased plantings in the Bundaberg region.

New production is growing 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, this will add to production volumes (industry consultation).

Productivity and profitability

In 2016, growers received a favourable \$5.20 to \$5.60 per kilogram NIS for their nuts. Favourable nut prices are due, in part, to growth of the China market. In 2007, prices fell to between \$1.20 and \$1.50 per kilogram NIS, which for a majority of growers at the time was below the cost of production.

Current Australian macadamia yields have recovered from the lows recorded after the 2007 price drop. Faced with unprofitable production and adverse weather conditions, growers cut inputs, and average yield fell to 1.9 tonnes per hectare NIS. A restoration of price together with favourable seasonal conditions and a concerted extension program have helped yields recover to about three tonnes per hectare. As past research results are being implemented, yield might grow to an average of four tonnes per hectare NIS. More encouragingly, new research may boost yields to six to seven tonnes per hectare NIS on some commercial blocks.

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

1 Hort Innovation (2016) Strategic Investment Plan Working Paper No. 1

2 Hort Innovation (2016) Strategic Investment Plan Working Paper No. 1

3 MDM (2016) Annual Investment Plan (Marketing) 2016–2017 prepared by Lynne Ziehlke, Market Development Manager (MDM)

4 AMS and HAL (2013) Macadamia Industry Strategic Investment Plan 2014–2019

5 AMS website <http://australian-macadamias.org/industry/site/industry/industry-page/about-aussie-macadamias/statistics/statistics/australian-production-and-prices-from-2013>

Figure 1: Macadamia industry value chain



Markets

The Australian macadamia industry has benefited from a sound export-focused growth program. In 2015, Australia exported 70 per cent of its total production⁶. Although Australia exports macadamias to 40 countries, there is significant opportunity for export growth. Major export markets include Europe, Japan and the United States. Growing markets include Taiwan and Korea, while China is a major NIS market. With successful Free Trade Agreements in place, strong growth in China, Japan and Korea is forecast.

The Australian macadamia industry regards the domestic market as just one of its key destinations.

Value chain

The Australian macadamia industry value chain is shown in *Figure 1*.

Macadamia growers sell directly to processors or in-shell handlers who take the product and dry it. The product is either sold as in-shell or cracked to produce kernel. In-shell handlers and processors manage over 95 per cent of macadamias produced in Australia. There are 12 Australian macadamia processors/handlers⁷.

Secondary marketers include the following: businesses that repack 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 macadamias.

Secondary marketers largely control the development and market positioning of macadamia products, and their macadamia content⁸.

Consumption and product form

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. Macadamia oil is a valuable product with

a diverse range of uses, including in salads and cosmetics. Macadamia milk has gained a share of the non-dairy milk sector dominated by soy-based beverages.

Most macadamias are sold in kernel form. However, there are expanding export opportunities in markets that prefer macadamias nut-in-shell, such as China⁹.

World production

In 2016, world macadamia production was approximately 175,000 tonnes NIS. Australia and South Africa were the largest producers, each marketing around 30 per cent of world output¹⁰. Other significant producers include Kenya with 20 per cent of world output, and Hawaii with 10 per cent. Emerging producers include China with three per cent of world output, with Guatemala, Malawi and Brazil producing the balance.

Production outlook

From 2012 to 2016, world macadamia production increased by 35 per cent, and significant increases are forecast over the life of this plan. Production from emerging regions including China is expected to grow faster than in established origins. Although continued drought in South Africa will suppress production in 2017, its output will be boosted from 2018 by an expansion of growing areas.

Kenya aspires to become a larger grower of macadamia nuts; the crop is profitable and is being used to alleviate poverty. China wants to increase its production, and has targeted an increase from 10,000 tonnes NIS in 2016 to 100,000 tonnes NIS in the medium term. Vietnam will also increase macadamia output. Australian production is likely to increase by about 10,000 tonnes NIS between 2016 and 2022.

By 2022, it is conceivable that world macadamia output will be 300,000 tonnes. Some forecasts indicate a possible production of as much as 600,000 tonnes by 2022¹¹.

Australia must market ahead of the anticipated increase in world supply. Where possible, price is determined by value rather than under-supply (AMS October 2016).

⁶ Hort Innovation (2016) *Australian Horticulture Statistics Handbook 2014–15*

⁷ MDM (2016) Annual Investment Plan (Marketing) 2016–2017 prepared by Lynne Ziehlke, Market Development Manager (MDM)

⁸ MDM (2016) Annual Investment Plan (Marketing) 2016–2017 prepared by Lynne Ziehlke, Market Development Manager (MDM)

⁹ Hort Innovation (2016) *Australian Horticulture Statistics Handbook 2014–15*

¹⁰ It is not appropriate to attribute 30 per cent of world production to South Africa in 2016 as they experienced a poor crop, but in a normal year, 30 per cent is correct (Lynne Ziehlke, MDM written communication February 2016).

¹¹ MDM (2016) Annual Investment Plan (Marketing) 2016–2017 prepared by Lynne Ziehlke, Market Development Manager (MDM)

Marketing and research imperative

With the forecast of rapid growth of world production from 2018, Australia must continue to lift macadamia productivity and build demand for Australian macadamias with manufacturers and consumers at profitable prices.

The forecast increase in world macadamia production will unseat Australia from its position as the largest supplier. In 2011, Australia accounted for 40 per cent of world macadamia output, but by 2022, it is forecast to contribute only 20 per cent of that total.

To date, Australia has succeeded in building demand by working with macadamia industries in other countries. Australia has improved its international links in the commercial sector and at industry level. Recently, the Australian industry has started a joint health research project and collaborated with other countries on data collection. Despite these promising moves, there is a pressing need for international cooperation on production forecasting.

Corporate services and strategic drive

Australia has a unique opportunity to work with the world industry and to guide the increase in supply at profitable prices. A program is needed that enables and facilitates cooperation across all sectors, from commercial players through to industry. To achieve this aim, the Australian macadamia industry needs highly effective and cooperative industry structures, and an SIP that supports industry endeavours.

Environmental scan

The environmental scan was completed in a workshop with the SIAP on 7 September 2016. The results of that scan are shown in **Appendix 5**.

Risk analysis

After industry consultation and consideration of the risk assessment prepared for the Annual Investment Plan (Marketing) 2016–17 (MDM 2016), a risk analysis was prepared. Critical industry risks most relevant to R&D and marketing include the following:

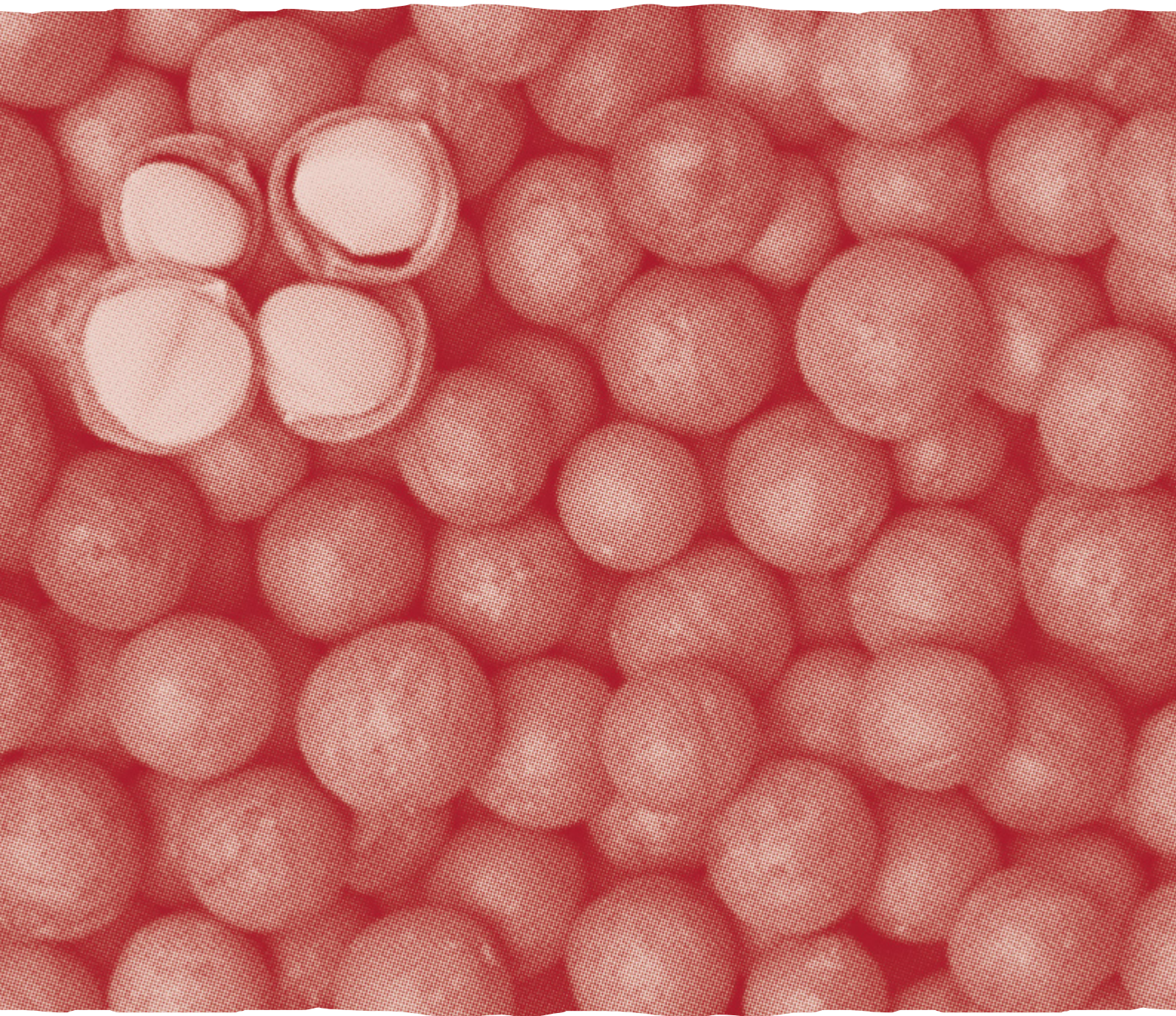
- A major increase in world macadamia production post-2018 in the absence of an effective Australian marketing strategy
- Chinese and Vietnamese production – limited information on production and market destination
- Commoditisation of macadamias, that is, an undifferentiated product sold primarily on price
- A food safety or allergy scare that diminishes Australia's clean and green positioning and, thus, macadamia demand
- A serious challenge to the health benefits of nuts
- A loss of engagement between the industry marketing program and the commercial sector marketers
- Gradual erosion of community licence to operate, particularly in the Northern Rivers and particularly when combined with rising land values
- A pest or disease outbreak that cannot be managed with existing chemical or biological controls
- The creation of a cultural divide within the industry based on different R&D and extension needs in the north and the south
- A major redefinition of marketing and R&D that has implications for overall SIP resources
- A loss of Australian Government matching funding for R&D.

Operating environment

The results of the industry profile, environmental scan and risk assessment are summarised in a Strengths, Weaknesses, Opportunities and Threats (SWOT).

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 • Technological know-how, an IPM culture, and flat land suitable for mechanisation, for example, 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 production relative to macadamias grown in other countries (Note: there is some evidence to suggest that Australian costs are not that much higher than elsewhere and that the gap is narrowing – AMS advice, January 2017) • Geographic concentration – vulnerable to climatic events and pest incursion (SIP 2014) • A shortage of supply that has resulted in very little new product innovation • Production in what are now peri-urban areas, which has implications for farm expansion and farm operation, including use of production chemicals • Historically, the industry has been hit by confidence ‘zapping’ price collapses, in 1990, 2000, 2007 • World macadamia kernel consumption is concentrated in six key markets – United States, Europe (primarily Germany), Australia, Japan, Korea and Brazil – and while these markets are large, a change in access could affect total sales. More than 95 per cent of NIS sales is to one market – China.
Opportunities	<ul style="list-style-type: none"> • Average productivity is well below that of industry leaders. Lift average industry yield from three tonnes per hectare NIS to five tonnes per hectare by 2022; i.e. target a sound kernel yield of approximately 1.3 to 1.5 tonnes per hectare by 2022 • 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 two per cent 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.

The macadamia industry	
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.



2

SECTION TWO

Macadamia industry outcomes

Industry outcomes

OUTCOME 1

Increased productivity and grower returns through an average yield increase to five tonnes nut-in-shell per hectare by 2021

- Investment in this outcome, encompassing pest/disease management, physiology, mature nut recovery and objective measures of environmental sustainability, provides the knowledge to improve current production systems. A second outcome addresses radically improved production systems for the mid-term future
- Research for productivity and grower returns encompasses:
 - » Pest and disease research priorities include biological diseases, fruit-spotting bug, macadamia lace bug, Sigastus weevil and various caterpillars, including banana fruit caterpillar. Macadamia growers report that pest pressure is increasing, new problematic species are emerging, and pests/diseases are spreading between production areas. Analysis has shown that research to reduce pest/disease pressure and unsound kernel received by processors would have a high impact on grower returns
 - » A long-term commitment to an improved understanding of the physiology of the macadamia. This research is essential in understanding the yield potential of existing orchards, pollination, light and canopy management, and the role of growth regulators. An improved understanding of tree physiology will also inform future orchards and radically improve production systems. Industry identified physiological research as a high priority that must not be neglected in favour of short-term needs
 - » Nut-recovery strategies including harvest. Strategies addressing improved nut recovery should target harvest efficiency, reduced harvest period, reduced nut loss on-farm, and through the value chain. An unknown percentage of mature nut yield is lost on-farm (possibly 30 per cent). A better understanding of the sources of this loss and the quantum involved is expected to provide a significant and rapid return for growers
 - » Objective measures of environmental sustainability. Good agricultural practices and the bona fides of strong stewardship of the natural capital resource base have become increasingly important to the marketing of nut crops. They also provide the basis for a lasting comparative advantage for Australia. Good agricultural practice also helps retain the industry's social licence to operate within its community
- Delivery of this outcome targets the industry's two highest research priorities: pest and disease management, and physiological research.

OUTCOME 2

Improved production systems covering plant breeding, intensive orchards and novel technologies

- Production systems are the way the macadamia industry combines varieties, planting, input management and harvesting technologies to maximise production efficiency while reducing production risks
- This outcome embraces longer term fundamental research required to shift current production into radically improved systems that feature the following: new varieties on dwarfing rootstocks; higher density of trees down a row; higher returns earlier in an orchard's life; consistently higher yields; lower production risk; and what is now considered to be novel production technology
- Plant breeding to deliver new production systems that target yield, tree size, nut quality, rootstocks and pest resistance. New varieties produced by the breeding program will be delivered to growers sooner using genomics and clonal technologies. The breeding program includes a nominal allowance for conservation of wild macadamia stocks
- New varieties will be faster maturing and will provide a break-even financial return for growers in fewer years
- Intensive orchards will be based on dwarfing rootstocks. The absence of dwarfing rootstocks has held back the development of intensive orchards in the macadamia industry. In 2016, the University of Queensland macadamia breeding program staff report identified potential isolation of relevant genetics (Mobashwar Alam, pers. communication)
- Novel technologies relevant to future orchards might include precision agriculture systems, drone and harvest technology, some of which will be developed through the Hort Innovation Centre for Field Robotics. Other novel crop technologies relevant to radically improved production systems might include biological and non-chemical pest and disease controls, such as use of sonics. With limited research funds, the macadamia R&D program will not make direct investment in novel technologies requiring fundamental research but will encourage their adaptation for use in the macadamia industry
- This outcome focuses on generating a measure of excitement in the Strategic Investment Plan 2016/17-20/21. It is more than a 'business as usual' response to R&D investment needs, and captures the priority-setting workshop's expressed need for a measure of vision and inspiration in the new plan. Strategies in this outcome statement were identified as needing long-term continuous funding – a medium priority by industry.

OUTCOME 3

Improved capacity to lead and support current and future industry needs

- Industry development and data insights encompass:
 - » A pro-active and systemised extension program that includes grower group sessions to share best practice
 - » A GIS system to facilitate industry development, including biosecurity management and crop forecasting
 - » Data collection and reporting, including production, markets, new product development and environmental sustainability
 - » Continuation of engaging communication programs that are well regarded by growers
 - » Skills, leadership and capacity building in partnership with Hort Innovation
 - » Maintaining the quality of international networking and the personal and industry insights that are gained from funding national and International forums and study tours
- Industry development and data insights, especially extension, were identified as a high program priority.

OUTCOME 4

Market demand for Australian macadamias has increased and expanded

- An effective marketing program drives demand, underpins the premium paid for Australian macadamias and the price received by levy-paying growers
- The Australian macadamia industry supplies more than 40 export destinations with core markets in Australia, Japan, Europe/Germany, USA and China. Taiwan and Korea have been identified as 'important potential new core markets' (AMS Advice, February 2017)
- The industry has a positive view about forecasted large increases in world production, embracing the challenge of increased supply through a program of market development that includes:
 - » Developing an even more detailed understanding of world production and target export markets
 - » A business-to-business (B2B) campaign that encourages new product development by food manufacturers
 - » Engaging with the commercial sector to execute the B2B strategy
 - » Supporting food manufacturers and the commercial sector with cost-effective, visible consumer promotion
 - » Continuing to build the Australian macadamia brand
 - » Providing more evidence on the health benefits of consuming macadamia nuts
 - » Initiating connections and engagement with overseas macadamia industries and other nut industries
 - » An aggressive key performance indicator embracing the continuous launching of new products
- Australian macadamias are overrepresented in the snacking category, such as retail packs of whole fresh kernels. Development of new manufactured products that use Australian macadamias offers opportunity to grow the macadamia market. Products manufactured with macadamias are less sensitive to high prices (macadamias account for a lesser share of overall product cost), potentially making use of different grades of nut and, once launched, are less prone to be discontinued by retailers than products in the snacking category if the price of macadamias changes (MDM advice)
- The MDM has requested that the presentations of market development strategies be somewhat generic to maintain their commercial confidentiality
- Market development to grow the demand for Australian macadamias and keeping demand ahead of supply was identified by growers as their highest priority overall.

3

SECTION THREE

Macadamia industry priorities

Industry investment priorities

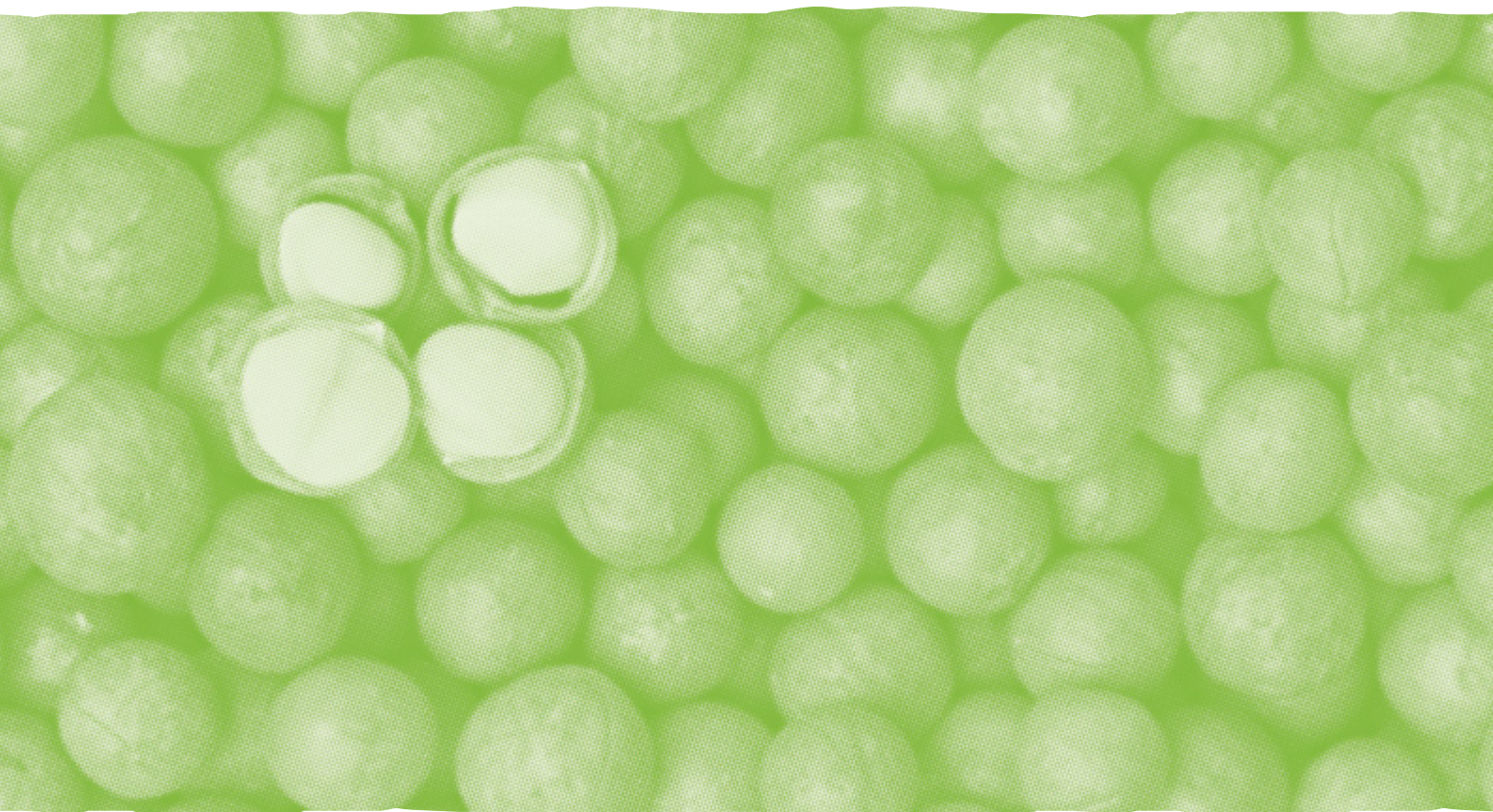
Strategies and possible deliverables associated with each industry outcome are provided in this section.

OUTCOME 1 – Increased productivity and grower returns through an average yield increase to five tonnes nut-in-shell per hectare by 2021 (equivalent kernel of 1.65 tonnes per hectare)	
STRATEGIES	POSSIBLE DELIVERABLES
<p>PEST AND DISEASE MANAGEMENT STRATEGIES</p> <p>Reduce unsound kernel and nut-in-shell by further enhancing the industry's integrated pest management (IPM)</p> <p>Reduce unsound kernel and nut-in-shell by further enhancing the industry's integrated disease management (IDM)</p> <p>Complement IPM and IDM with a program of investment in chemical registration and renewal to ensure an appropriate suite of control measures</p> <p>Increase grower adoption of IPM and IDM</p>	<ul style="list-style-type: none"> • Effective controls for fruit-spotting bug, Sigastus weevil, and macadamia lace bug • Effective and responsible controls including extension and training for banana-spotting bug and banana fruit caterpillar • Augmentation of IPM principles with the roll-out of area-wide management, coordinated and sequenced use of soft chemicals, and use of beneficial insect predators • Biological disease controls • Effective and responsible controls for trunk canker, phytophthora root rot and dry flower blight (<i>Pestalotiopsis</i> spp.) • Augmentation of IDM principles with the roll-out of area-wide management programs and coordinated and sequenced use of soft chemicals • Minor Use Permits for chemicals relevant to the control of current and emerging macadamia pests and diseases • Further development of an IPM and IDM adoption strategy • Roll-out of IPM and IDM adoption strategy through the industry's extension program

OUTCOME 1 – Increased productivity and grower returns through an average yield increase to five tonnes nut-in-shell per hectare by 2021 (equivalent kernel of 1.65 tonnes per hectare)	
STRATEGIES	POSSIBLE DELIVERABLES
PHYSIOLOGICAL RESEARCH STRATEGIES Commit to long-term research to improve the understanding of the physiology of the macadamia, an Australian native with a relatively short history of domestication	<ul style="list-style-type: none"> • An improved understanding of tree physiology by variety (a major undertaking) • An improved understanding of macadamia yield potential through data on what the tree is capable of producing under ideal conditions • An improved understanding of the causes of pre-maturity nut shed, including the role of pollination • An improved understanding of light and canopy management, to deliver higher yields through improved light, canopy and old tree management • An improved understanding of the impact and potential role of growth regulators
NUT-RECOVERY STRATEGIES INCLUDING HARVEST Improve harvest efficiency and resultant nut capture Reduce harvest time to free up farm resources that improve farm productivity Reduce nut loss along the value chain	<ul style="list-style-type: none"> • Desktop review of harvest efficiency to inform future research investment • Research strategies to reduce harvest time • Implications of reduced harvest time on supply chain infrastructure • Improved understanding and quantification of mature nut loss on-farm, including pest/disease, pollination, washed away, covered by erosion, vermin, and missed by harvester; in-shed at de-husking; and with the processor as sound nut recovery
ENVIRONMENTAL SUSTAINABILITY STRATEGIES Develop, agree and report objective measures of environmental sustainability	<ul style="list-style-type: none"> • Agreed objective measures of environmental sustainability • Publish a biannual environmental sustainability report card

OUTCOME 2 – Improved production systems covering plant breeding, intensive orchards and novel technologies	
STRATEGIES	POSSIBLE DELIVERABLES
Leverage past investment and continue to commit to a long-term effort to deliver a radically improved production system Develop novel technologies that facilitate improved production systems Incubate grower-inspired innovation for wider application in the macadamia industry Scan opportunities for novel technologies deployed in other tree crops, agricultural and non-agricultural sectors	<ul style="list-style-type: none"> • An innovative breeding program that includes deployment of genomics and clonal technologies to deliver increased yield and pest-resistant varieties • Conservation of wild macadamia stocks through support for the work of the Macadamia Conservation Trust • Dwarfing rootstocks and varieties for orchard intensification • Research knowledge that describes 'second generation' intensive orchards for the Australian macadamia industry • Crop protection, for example, sonics and other non-chemical controls • Tools and/or models to predict tree yield • Support promising ideas with recognition and/or small cash grants and prizes that encourage further development of prototypes and the sharing of emerging innovation, including its intellectual property • Excite the research community with recognition and/or small cash grants and prizes for ideas gleaned from other industries that show promise in macadamia production

OUTCOME 3 – Improved capacity to lead and support current and future industry needs	
STRATEGIES	POSSIBLE DELIVERABLES
Continue to support adoption of R&D outputs by effective extension	<ul style="list-style-type: none"> A proactive and systematised extension and adoption program that includes grower group sessions ('Mac Groups') to share best practice
Deliver meaningful data on production, planting, environmental performance, supply and demand in a timely manner	<ul style="list-style-type: none"> Extension deliverables to include IPM and IDM, water-use efficiency; soil health and nutrition; spray systems for managing pests and diseases; light, orchard floor, and canopy management strategies; strategies to maximise old orchard performance; optimisation of existing harvest machinery; adoption packages for new varieties and novel technology innovations
Ensure industry stakeholders remain engaged through an effective communications program	<ul style="list-style-type: none"> Improved GIS mapping of orchards to facilitate industry development, including biosecurity management and crop forecasting
Enhance skills and capacity to support current and future industry needs	<ul style="list-style-type: none"> Prepare a 'state of the macadamia industry' publication every second year, addressing plantings, production, markets, supply and demand, export, new product development, and environmental sustainability including the collection of nursery statistics on number of trees sold each year by variety and region A communication program that includes a biannual macadamia industry conference (and a biannual all-of-nut-industry Australian Nut Industry Council (ANIC) conference in non-macadamia industry conference years), R&D and marketing updates, newsletters, website and other proven effective industry communication tools Work with Hort Innovation to support investments in skills, leadership and capacity building A regular program of study tours that includes Australian and international Macadamia industries



OUTCOME 4 – Market demand for Australian macadamias has increased and expanded	
STRATEGIES	POSSIBLE DELIVERABLES
<p>Develop a five-year marketing plan supported by annual operating plans with clear reporting criteria that meet Hort Innovation monitoring and evaluation requirements</p> <p>Develop a more complete world macadamia production forecast</p> <p>Continue to curate, analyse and publish relevant market information and statistics through existing communication channels to support industry and commercial marketer decision making</p> <p>Develop and publish a compelling suite of information for food manufacturers that promotes the use of macadamias as an ingredient</p> <p>Actively promote and distribute compelling information on the use of macadamias as an ingredient to food manufacturers in key target markets</p> <p>Create a culture of innovation by demonstrating new ways to use macadamias</p> <p>Support food manufacturers with cost-effective, visible consumer promotion</p> <p>Use and further build the Australian macadamia brand to deliver all communications</p> <p>Facilitate and support connections and engagement with overseas macadamia industries and other nut industries</p>	<ul style="list-style-type: none"> • A five-year marketing plan and annual operating plans • A mid-term and final evaluation that addresses delivery of monitoring and evaluation requirements, the success of the marketing investment and return on investment for growers • Annual global crop forecast updates increasing in accuracy and reliability over time • A suite of reports to meet the needs of various industry groups, including monthly and quarterly executive reports, situation analyses, retail sales, global consumption, market development segments evaluated, and new product development • Ongoing research that supports the use of macadamias in food manufacturing, including technical information, health research and consumer insights • A range of content and collateral that showcases the information to food manufacturers • Databases of target food manufacturers and industry marketers • Content and collateral distributed to food manufacturers through the commercial marketers (direct), existing channels (website, newsletters), events (trade shows, conferences, other events), and media • New product ideas gleaned through contests and challenges to the food manufacturing R&D community (a 'virtual innovation hub') • Consumer promotion campaigns in key markets • Content, collateral and platforms that position the Australian industry as the expert • A broader range of international data, including retail sales data • Cost sharing with overseas macadamia industries (e.g. maximum residue limit applications) • Assistance to develop other overseas macadamia industry marketing capacity • Where commercially acceptable, investigate option to co-market • Joint projects with other tree nut industries that leverage available levy funds • Macadamia-specific clinical health trials

Aligning to Hort Innovation investment priorities

In establishing investment priorities, Hort Innovation analysed both historical and current levy and co-investment portfolios and priorities. From this analysis, we identified 11 cross-sectoral investment themes. We consolidated these themes further and considered their alignment with the Australian Government's Rural RD&E Priorities and National Science and Research Priorities, to arrive at five investment priorities outlined in **Figure 2**. **Figure 2** also shows how each cross-sectoral investment theme relates to the five investment priorities.

Figure 2: Hort Innovation's investment priorities



SECTION 3: MACADAMIA INDUSTRY PRIORITIES

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

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

Hort Innovation investment priorities	Macadamia SIP outcomes
Support industry efficiency and sustainability	1. Average yield increased to five tonnes nut-in-shell per hectare by 2021 (1.65 tonnes per hectare – kernel)
Improve productivity of the supply chain	2. Improved production systems covering plant breeding, intensive orchards and novel technologies
Grow the horticulture value chain capacity	3. Improved capacity to lead and support current and future industry needs
Drive long-term domestic and export growth	4. Market demand for Australian macadamias has increased and expanded
Lead strategically to enhance the development of the Australian horticulture industry through operational excellence	Enabler

4

SECTION FOUR

Macadamia industry monitoring and evaluation

Macadamia SIP monitoring, evaluation and reporting

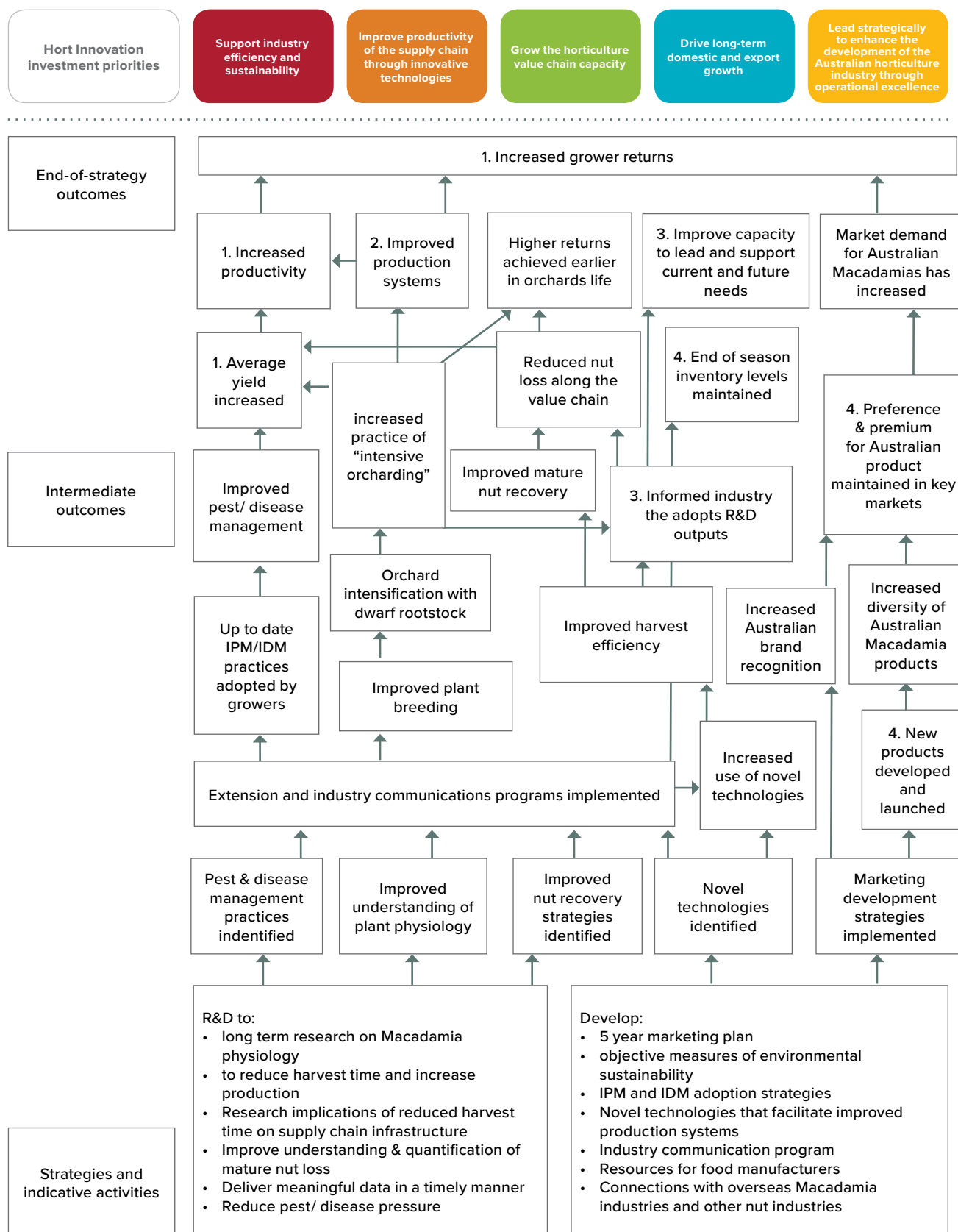
A SIP program logic and monitoring and evaluation (M&E) plan has been developed for the macadamia SIP. These are informed by the Hort Innovation Organisational Evaluation Framework. The logic maps a series of expected consequences of SIP investment. The M&E plan shows the performance measures that will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

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

Macadamia SIP logic

An indicative Macadamia SIP program logic is shown in **Figure 3**. The logic is based on the Hort Innovation SIP logic hierarchy (**Appendix 4**). The shaded boxes are not fully explicit in the strategy but necessary conditions for the achievement of expected outcomes.

Figure 3: Macadamia SIP logic



Macadamia SIP M&E plan

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

Table 2: Monitoring and evaluation plan for the macadamia SIP

Outcome	Strategies	KPIs	Data collection methods and sources
OUTCOME 1: Increased productivity and grower returns through an average yield increase to 5 tonnes nut in shell per hectare by 2021	Reduce unsound kernel and nut-in-shell by further enhancing the industry's integrated pest management (IPM)	<ul style="list-style-type: none"> Yield has increased to five tonnes nut-in-shell per hectare Unsound kernel received by processors reduced from 3 per cent to 2.5 per cent 	<ul style="list-style-type: none"> Industry benchmarking yield and quality data Survey of processors to determine unsound kernel levels at start and end of SIP Hort Innovation Minor Use Permit approval data Survey of growers to determine adoption levels of IPM and IDM Research reports Grower surveys to determine changes in harvest period Surveys (across the value chain) on mature nut loss Environmental sustainability R&D research reports
	Reduce unsound kernel and nut-in-shell by further enhancing the industry's integrated disease management (IDM)	<ul style="list-style-type: none"> Greater than 95 per cent approval rate for any new Minor Use Permit applications Evidence of increased grower knowledge and awareness of IPM and IDM 	
	Complement IPM and IDM with a program of investment in chemical registration and renewal to ensure an appropriate suite of control measures	<ul style="list-style-type: none"> Evidence of adoption of IPM and IDM (number of growers/percentage of production base) 	
	Increase adoption by growers of IPM and IDM	<ul style="list-style-type: none"> Evidence of improved understanding of the physiology of the macadamia, and recommendations for increasing yields towards six tonnes NIS per hectare 	
	Commit to long-term research to improve the understanding of the physiology of the macadamia, an Australian native with a relatively short history of domestication	<ul style="list-style-type: none"> Evidence of reduced harvest time from six months towards four months Evidence of improved understanding of mature nut loss on-farm, in-shed, and at processing 	
	Improve harvest efficiency, and resultant nut capture	<ul style="list-style-type: none"> Agreed objective measures (metrics) of environmental sustainability by 2018 	
	Reduce harvest time to free up farm resources that improve farm productivity	<ul style="list-style-type: none"> Annual data collected on agreed metrics and report card on environmental sustainability distributed by end of SIP 	
	Reduce nut loss along the value chain		
	Develop, agree and report objective measures of environmental sustainability		

Outcome	Strategies	KPIs	Data collection methods and sources
OUTCOME 2: Improved production systems covering plant breeding, intensive orchards and novel technologies	Leverage past investment and continue to commit to a long-term effort to deliver a radically improved production system	<ul style="list-style-type: none"> Evidence of improved foundational knowledge on intensive orchard systems Evidence of the Macadamia Breeding Program making use of best practice technologies, including genomics and clonal technologies Progress has been made with conservation of wild macadamia stocks through levy support for the Macadamia Conservation Trust By 2019, the industry has explored international collaboration on breeding to lower the cost of new variety development and improve the rate of genetic gain Recommendations on preferred rootstocks for new orchards are available Number of growers/percentage of production base that has adopted on-farm improved production systems R&D 	<ul style="list-style-type: none"> Macadamia Breeding Program/ intensive orchard system R&D research reports Macadamia Conservation Trust interviews and judgements made on progress with germplasm conservation Report detailing the feasibility and risk associated with an international collaboration on breeding Grower and industry development personnel survey Area of new orchards planted using intensive orchard systems
	Develop novel technologies that facilitate improved production system		
	Incubate grower-inspired innovation for wider application in the macadamia industry		
	Scan opportunities for novel technologies deployed in other tree crops, agricultural and non-agricultural sectors		
OUTCOME 3: Improved capacity to lead and support current and future industry needs	Continue to support adoption of R&D outputs by effective extension	<ul style="list-style-type: none"> Percentage of production volume that is aware, informed and willing to adopt relevant R&D project outputs Evidence of data being delivered by the R&D program is used in grower and industry decision making Effective GIS mapping system in place 'State of the macadamia industry' report produced and distributed biannually from 2019 Study tours and research symposium are completed by levy-paying growers or their representatives, with participants providing a satisfaction rating of high or very high (measured as 'developed valuable networks', 'learnt new information', 'intending to implement new learnings on-farm') 	<ul style="list-style-type: none"> Industry development and R&D project records Extension event feedback Grower surveys to determine R&D project awareness and willingness to adopt Grower and supply chain surveys to determine the value of R&D project-generated data Study tour and research symposium feedback surveys
	Deliver meaningful data on production, planting, environmental performance, international supply and demand in a timely manner		
	Ensure industry stakeholders remain engaged through an effective communications program		
	Enhance skills and capacity to support current and future industry needs		

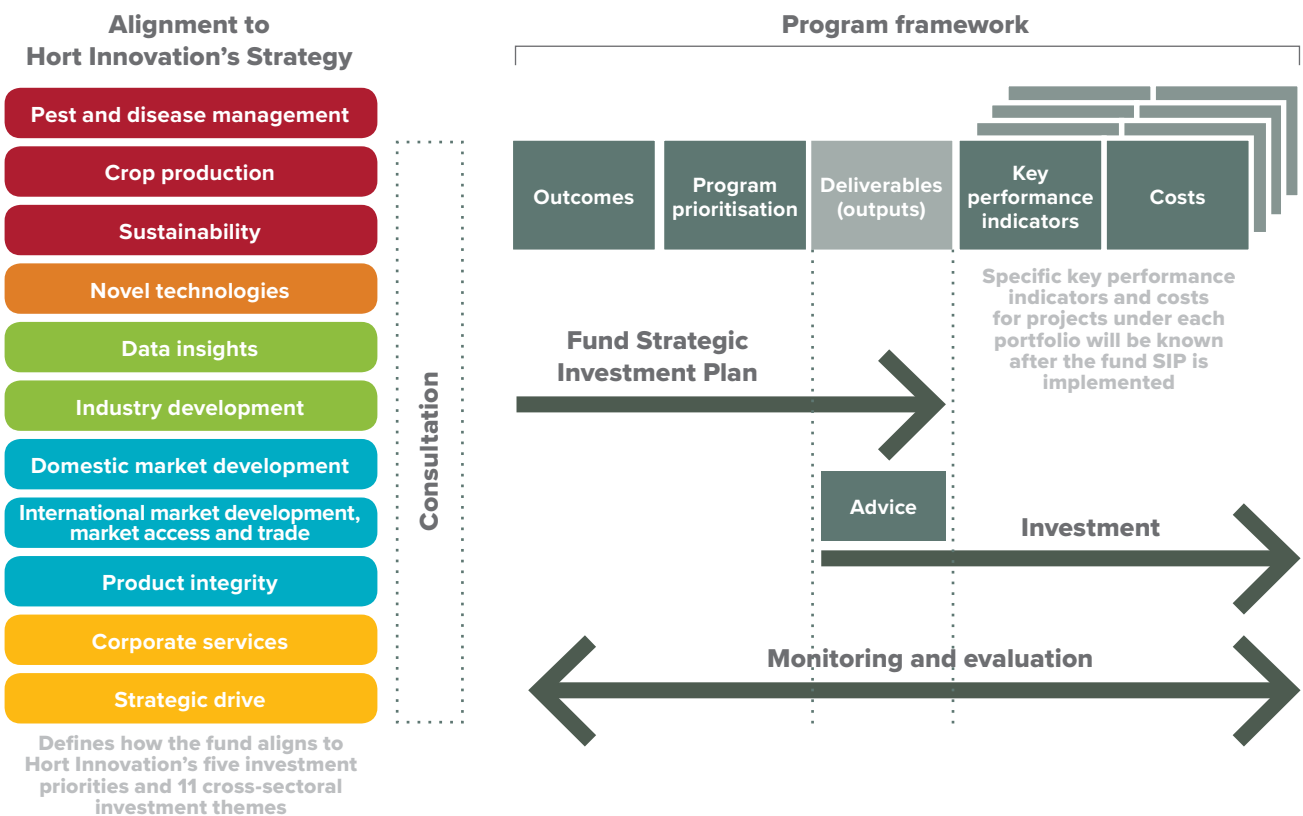
Outcome	Strategies	KPIs	Data collection methods and sources
OUTCOME 4: Market demand for Australian macadamias has increased and expanded	<p>Develop a five-year marketing plan supported by annual operating plans with clear reporting criteria that meet Hort Innovation monitoring and evaluation requirements</p> <p>Develop a more complete world macadamia production forecast</p> <p>Continue to curate, analyse and publish relevant market information and statistics through existing communication channels to support industry and commercial marketer decision making</p> <p>Develop and publish a compelling suite of information for food manufacturers that promotes the use of macadamias as an ingredient</p> <p>Actively promote and distribute compelling information on the use of macadamias as an ingredient to food manufacturers in key target markets</p> <p>Create a culture of innovation by demonstrating new ways to use macadamias</p> <p>Support food manufacturers with cost-effective, visible consumer promotion</p> <p>Utilise and further build the Australian macadamia brand to deliver all communications</p> <p>Facilitate and support connections and engagement with overseas macadamia industries and other nut industries</p>	<ul style="list-style-type: none"> Five-year marketing plan and first annual operating plan (AOP) in place by 30 June 2017 Relevant and appropriate market development data and insights included in 'State of the macadamia industry' biannual report from 2019 Market information and statistics that meet the commercial sector's needs Evidence of content and collateral distributed to marketers and food manufacturers Maintain inventory levels at less than 12.5 per cent at the end of the season Maintain preference and premium for Australian-grown product in key markets Evidence of potential new macadamia products and demonstration of new ways to use macadamias Evidence of engagement with overseas macadamia industries and other nut industries 	<ul style="list-style-type: none"> Marketing plan and AOPs records and impact assessment Marketing project records 'State of the macadamia industry' biannual reports Survey of marketers and processors to determine usefulness of market information and statistics Feedback from marketers and food manufacturers on value of marketing collateral Inventory data and premiums paid for Australian macadamias An annual list and tally of the new products launched that use Australian macadamias Industry development project records

Reporting

The program framework in **Figure 4** is the mechanism that links Hort Innovation's strategy and investment priorities to the investment process through the industry SIP. SIPs help Hort Innovation prioritise and implement the specific industry research, development and extension (RD&E) and marketing programs.

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

Figure 4: Hort Innovation's program framework

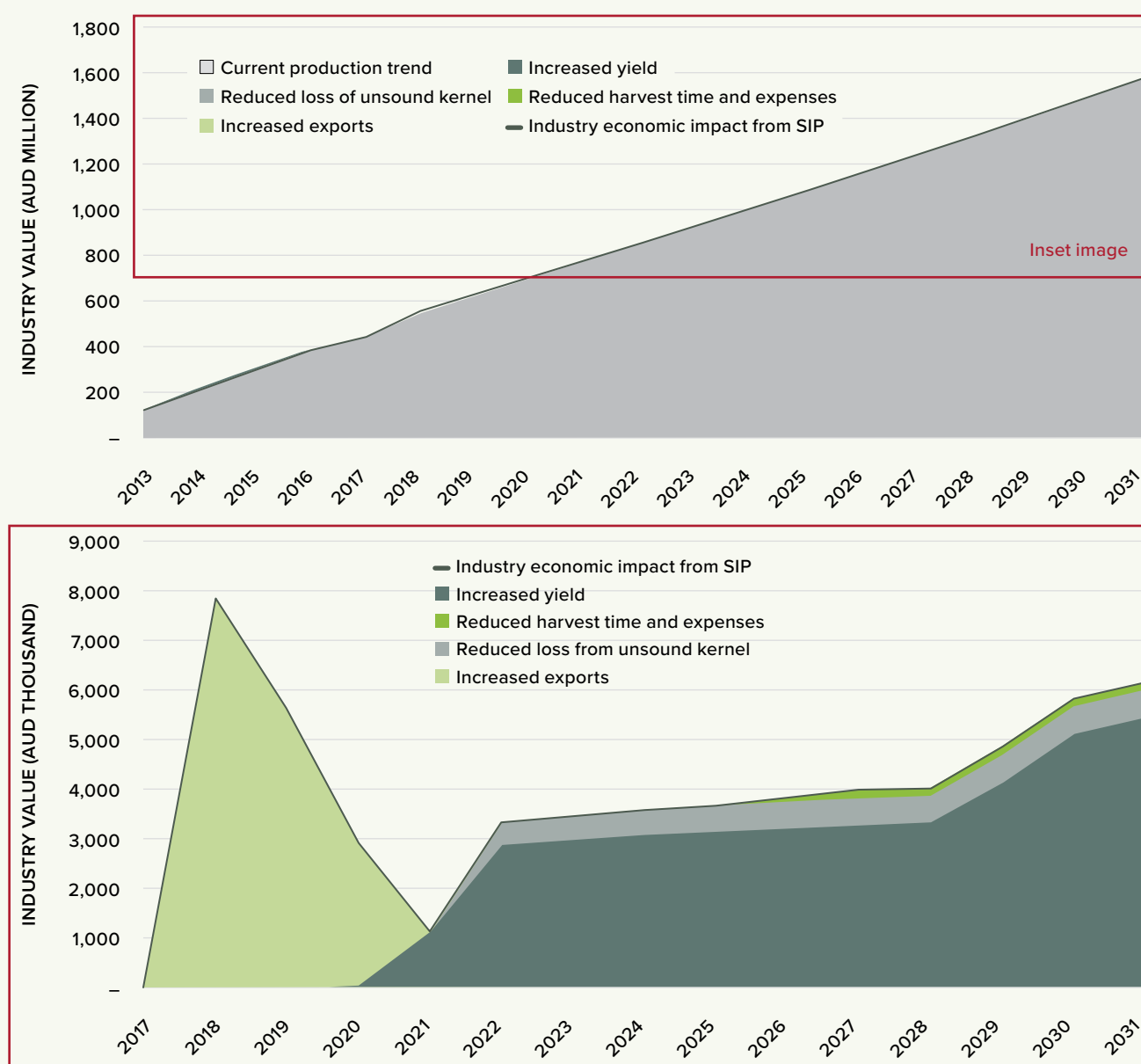


5

SECTION FIVE

Impact assessment

Figure 5: Economic benefit from investment in the SIP



An independent assessment of the potential economic impacts from investment into the macadamia SIP indicated a positive return on investment for the industry (**Figure 5**). The anticipated investment of \$24.2 million over the next five years in R&D, extension and marketing activities is expected to generate \$74.5 million in net benefits for the industry, representing a benefit cost ratio of 3.08 times to growers and service providers along the value chain.

The assessment draws from a wide range of available data sources, and projects economic impacts over a 15-year period starting from 2016/17. A five per cent discount rate has been applied and all values are adjusted for inflation and presented in 2016/17 dollar terms. The assessment takes a highly conservative approach and the presented figures have been adjusted to account for risks associated with achieving research outputs, expected adoption and impacts.

Table 3 provides a summary of the impacts assessed for the SIP, their corresponding outcomes, net economic benefits and benefit cost ratio.

Table 3: Overview of impacts assessed and alignment with SIP outcomes.

Outcome	Expected deliverables	Anticipated SIP investment (over five years)	Net benefits (over 15 years)	Benefit cost ratio
OUTCOME 1: Increased productivity and grower returns through an average yield increase to 5 tonnes nut in shell per hectare by 2021 And OUTCOME 2: Improved production systems covering plant breeding, intensive orchards and novel technologies	Pest and disease management strategies; improved understanding of tree physiology by variety and of macadamia yield potential; an improved understanding of the causes of pre-maturity nut shed including the role of pollination. A breeding program to deliver increased yield and pest resistant varieties; 'second generation' intensive orchards; crop protection; and tools to predict tree yield.	8,842,627	42,115,459	4.76
OUTCOME 1	Further development of an IPM and IDM adoption strategy; roll out of IPM and IDM adoption strategy through the industry's extension program.	2,658,346	6,136,130	2.31
OUTCOME 1	Technology and techniques to reduce harvest time and increase harvest resource efficiency	468,836	940,513	2.01
OUTCOME 4: Market demand for Australian macadamias has increased and expanded	Research and communicate the health benefits, value adding opportunities and potential additional markets to support increased Australian macadamia demand.	12,196,977	25,305,399	2.07

The quantified impacts associated with Outcome 1 and 2 are:

- Increased yield from better management of pests and diseases and, over the longer term, from pest resistant and higher yielding varieties.

Other quantified impacts associated with Outcome 1 are:

- Reduced loss of unsound kernel from adoption of IPM and IDM strategies;
- Reduced harvest times from heavier yielding varieties, resulting in a decreased cost of production from fewer harvest applications. Restricted by time to maturity for newly planted varieties.

The quantified impact associated with Outcome 4 is:

- Increased exports from expanded markets, driven in part from new product ideas. Linked to forecast excess production above expected demand from domestic consumption and baseline growth in exports.

Training and extension activities from Outcome 3 compliment the adoption and implementation of R&D and marketing from Outcomes 1, 2 and 4 and thus contribute to the delivery of all quantified impacts.

SECTION SIX

Risk management

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

This is also not general investment risks that will be considered in the project investment process.

Major implementation risks, their probability and impact are identified in **Table 4**.

Table 4: SIP implementation risks

Risk	Probability	Impact
Lack of unanimity between AMS and Hort Innovation makes delivery of the SIP untenable	Low	High
Industry decides cost of compliance with marketing levy governance exceeds loss of revenue from a voluntary and self-managed arrangement	Low	High
Lack of industry support for the R&D levy at the current rate	Low	High
Lack of industry support for the SIP	Low	High

N.B.: Risks identified in commentary provided by industry February 2017

Analysis of implementation risks highlights the importance of strategies identified under the Corporate Services and Strategic Drive outcome statement.

Figure 6: SIP development process



APPENDIX 1: SIP development process

Preplanning activities included review of relevant literature – and in particular the Macadamia Industry Strategic Investment Plan 2014–19, preparation of an industry profile, engagement with the SIAP and IRB – Australian Macadamia Society (AMS), and formulation of a consultation strategy with AMS’s assistance. The SIP development team had its first meeting with the SIAP in Brisbane on 26 July 2016. This meeting was used to review past and present R&D and marketing projects.

Preparation tasks included gathering input and data to inform the SIP, completion of an environmental scan with the SIAP on 7 September 2016, review of consumer and retailer trends, and a scan of innovative technology relevant to the macadamia industry. An R&D and Marketing gap and project identification workshop was completed with the SIAP on 8 September 2016.

On-farm interviews were completed with large Bundaberg macadamia growers on 5 and 6 October 2016. A ‘speed dating’ style approach was used to interview macadamia growers, processors, marketers and researchers at the Macadamia Conference on 18 to 20 October 2016. A briefing meeting was held with Lynne Ziehlke, Manager Macadamia Marketing Program, in Lismore 26 October 2016 to better understand the changing nature of the international macadamia market and the industry’s marketing program. Meetings with Macadamia Industry Productivity Manager Robbie Commens and AMS CEO Jolyon Burnett were also held on the same day. Individual interviews were completed with AMS Board members in September and October 2016. Individual interviews with large and small growers in New South Wales and Queensland, the supply

chain, the SIAP Marketing Sub-committee and researchers were also completed during this time. In total, more than 50 individual consultations were completed with key industry stakeholders. An online version of the consultation survey was posted on Survey Monkey, and notification of the opportunity to contribute was made via both the AMS Newsletter and Hort Innovation ‘Grower Intel’. Surveys were also distributed at the December 2016 Mac Group meetings.

A discussion paper providing early insight into SIP content and direction was circulated to the SIAP, AMS Board and staff on 24 November 2016. The discussion paper provided an overview of the Australian macadamia industry, the industry’s operating environment and a detailed analysis of 19 possible research/marketing issues. Each issue included a statement on why it was important, current situation with respect to the issue, desired future state, past and present investments, future investment needs, and possible KPIs. The SIAP and the CEO of AMS provided detailed comments on the discussion paper.

Subsequent SIP execution and validation included the following: participation in a SIAP Marketing Sub-Committee Strategic Planning day on 25 January 2017 in Brisbane; an independently facilitated SIAP workshop to review priorities on 31 January 2017 in Brisbane; creation of strategy, testing of strategy using benefit cost analysis; preparation of a monitoring and development framework, development or relevant summaries and a SIP Communication Plan. SIP validation included simultaneous provision of a draft SIP to Hort Innovation, AMS and industry, consideration of comments and posting a draft final on the Hort Innovation website. Hort Innovation presented an advanced draft SIP at the February–March 2017 Mac Group meetings.

APPENDIX 2: Consultation and validation

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

Name	Industry Role
Graeme Fleming	SIAP member, AMS Board
Andrew Pearce	SIAP member
Chris Searle	SIAP member
Lindsay Bryen	SIAP member
Trevor Steinhardt	SIAP member, AMS Board, SIAP Marketing Sub-committee
Andrew Starkey	SIAP member
Scott Alcott	SIAP member
Stephen McLean	SIAP member
Paul O'Hare	SIAP member
Steven Lee	SIAP member
Kim Wilson	SIAP member
David Zadro	Grower
Ray Norris	Grower
Jason Klotz	Grower
John Manera	Grower
Scot Norval	Grower
Kevin Steinhardt	Grower
Daniel Tranter (on behalf of Matt Burns, Andrew Strahley)	Grower
Richard Ray	Processor
Surrey Bogg	Grower
Peter Zummo	Grower
Alex Yong (on behalf of Mr Liu)	Grower
Chris Cook	Grower
Drewe Cowen	Grower
Mike Cooper	Grower
Craig Parish	Grower
James Auld	Grower
John Petorius	Grower
Andrew Leslie	Grower
Trevor and Barbara Martin	Grower
Mark Duncan	Grower

Name	Industry Role
Sheldon Dahms	Grower
Stephen Modra	Grower
Tony Kempnich	Grower
Richard Lindley	Grower
Matthew Durack	Processor shareholder, ex-R&D Committee Chair
Femi Akinsanmi	Researcher
Bruce Topp	Researcher
Craig Maddox	Researcher
Geoff Slaughter	Researcher
Mobashwar Alam	Researcher
Mark Hickey	Researcher
Jeremy Bright	Industry Development
Ruth Huwer	Researcher
Francois Visser	Researcher
Ian McConachie	Retired grower and Chair
Richard Doggett	AMS Chair
Michael Waring	AMS Board
Sandra Lindstrom	AMS Board
Larry McHugh	AMS Board, SIAP Marketing Sub-committee
Jolyon Burnett	AMS
Lynne Ziehlke	AMS
Robbie Commens	AMS
Richard Sampson-Genest	SIAP Marketing Sub-committee
Brian Loader	SIAP Marketing Sub-committee
Jacqui Price	SIAP Marketing Sub-committee
Lisa Worthington	SIAP Marketing Sub-committee
Jon Perrin	SIAP Marketing Sub-committee
Wayne Gersbach (for Keith Ryan)	Processor
George Haglos	Marketing
Greg Smith	Grower
Craig Mills	Grower, AMS Director
Geoff Chivers	Grower
James Keldoulis	Macadamia wholesaler

In addition, 13 confidential responses were received electronically through SurveyMonkey. From the nine surveys distributed with stamped self-addressed envelopes at the Macadamia Conference, six responses were received.

APPENDIX 3: Reference documents

AgEconPlus (2016) Discussion Paper to Inform Development of the Macadamia Strategic Investment Plan 2016–21

AMS website <http://australian-macadamias.org/industry/site/industry/industry-page/about-aussie-macadamias/statistics/statistics/australian-production-and-prices-from-2013>

AMS and HAL (2013) Macadamia Industry Strategic Investment Plan 2014–2019

AMS, HAL, New South Wales DPI and QDAF (2010) Mac Man Best Practice Group Results 2001 to 2009

Department of Agriculture and Water Resources (undated) Levy Rates and Commodity Details
<http://www.agriculture.gov.au/ag-farm-food/levies/rates#horticulture>

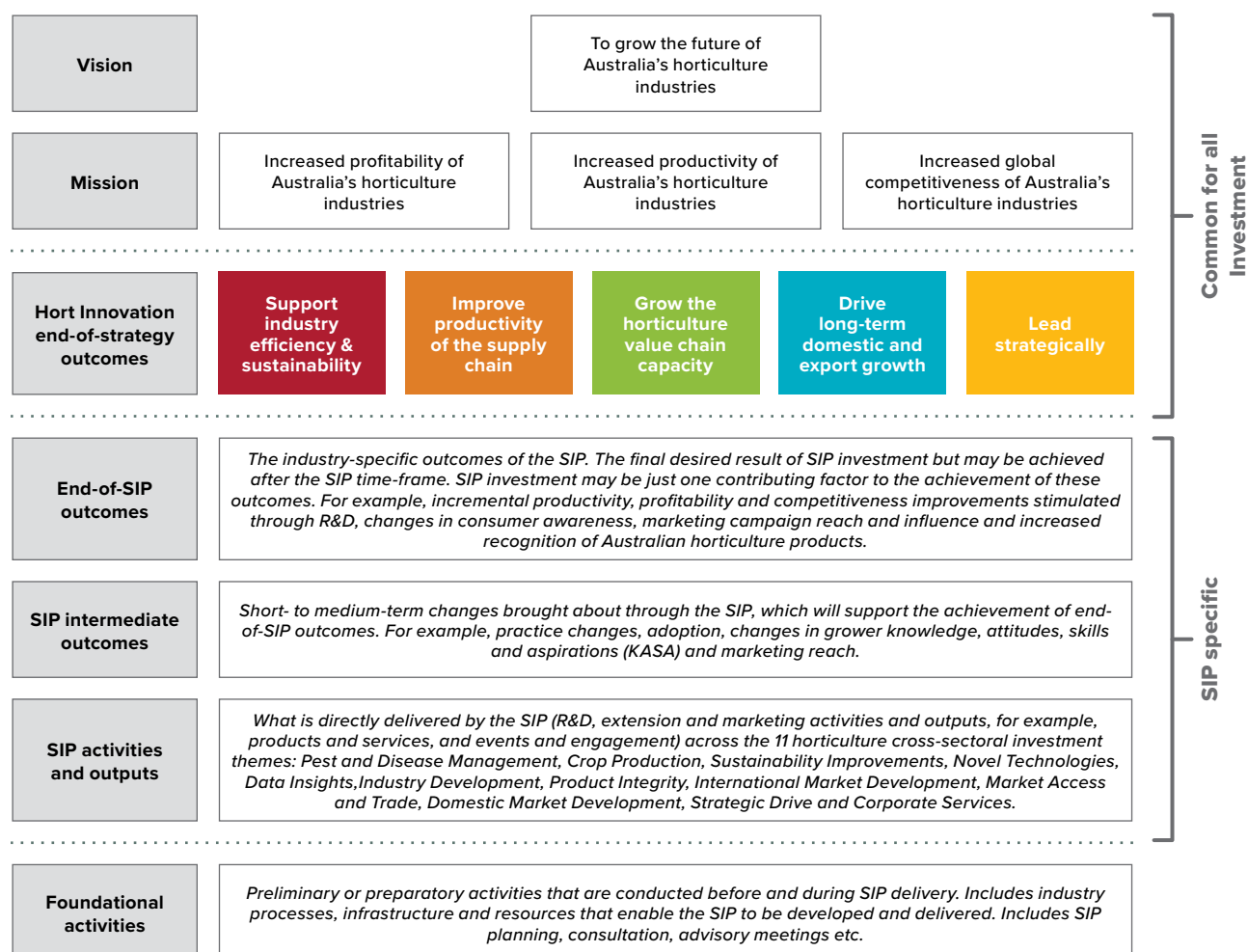
Hort Innovation (2016) Strategic Investment Plan Working Paper No. 1

Hort Innovation (2016) *Australian Horticulture Statistics Handbook 2014–15*

MDM (2016) Annual Investment Plan (Marketing) 2016–2017 prepared by Lynne Ziehlke, Market Development Manager (MDM)

Ziehlke, L (2016) Trade Marketing Strategy and Overall Campaign Briefing

APPENDIX 4: Logic hierarchy



APPENDIX 5: Environmental scan results

Positive	Negative
Pests and disease management	
IPM culture, resources and projects in place Nut borer control Biological controls for some pests Leading scientists working for the industry	Sigastus weevil major problem, control difficult Peri-urban growth impinging on growing areas Loss of access to chemicals Small market for new chemicals, none developed Reliance on old chemistry with sustainability issues Resistance to use of systemic chemicals Fruit-spotting bug is cause of greatest yield loss Rats and pigs are a big problem and need management plan Lace bugs Trees too tall and this results in poor spray coverage Retiring scientists Reduced State government support for research and extension
Crop production	
High farm-gate prices Recent advances in holistic approaches, for example, IPM Orchard intensification may have potential Education of growers on orchard productivity Benchmarking	Lack of scale in much of the production base Most of industry not irrigated Loss of scientists Orchard nut loss pre-processing may be 20 per cent Macadamia only three to four generations from wild tree Abnormal vertical growth – possibly a physiology issue Orchard practices dictated by long harvest Canopy management Poor soil/orchard floor management Yield varies significantly across growers No standards for nursery trees Improve inconsistent planting stock, non-clonal rootstock Inability to produce trees quickly Don't know how to get six tonnes/hectare yield consistently
Sustainability	
Growers committed to environmental sustainability Current focus on ground/soil management Low chemical-use crop (compared to other industries) Clean and green image	Improve nutrition and water retention Soil loss Urban encroachment Need to work toward substantiation of being clean and green Chemical use is increasing
Novel technologies	
Precision agriculture to identify healthy trees Precision agriculture to increase automation	Novel tech needed to remove labour costs Novel tech to improve harvesting technology Novel tech needed in plant breeding Lead time too long for new varieties Need biological and non-chemical crop protection

Positive	Negative
Data insights	
<p>Good Australian, global source market intelligence, data</p> <p>Global market statistics are available</p> <p>Crop forecast is prepared for Australia</p> <p>Good Australian production benchmarking</p>	<p>Lack detailed production data, for example, NIS/hectare by farm</p> <p>Poor farm yield-loss data</p> <p>Sales of trees by variety, by year is missing</p> <p>International production of data needs improving</p> <p>Crop forecasting on a global basis needs improving</p> <p>World planting data needs improving</p>
Industry development	
<p>Extension – strong, effective, industry driven</p> <p>Communication – range of methods being used</p> <p>Cooperative industry structures</p> <p>Industry with skilled and experienced HR</p>	<p>Need to attract new researchers and growers</p> <p>Many growers are not farmers (lifestyle)</p> <p>Ageing grower base</p> <p>Develop new industry leadership path</p> <p>Overreliance on goodwill of individuals in leadership positions</p> <p>Grower churn is ongoing challenge for extension</p>
Market development	
<p>Not reliant on domestic market – 70 per cent export</p> <p>Strong market growth, e.g. Nuts for Life</p> <p>Sustained sales at profitable prices</p> <p>Australian Macadamia Handlers Association (AMHA)</p> <p>Innovative social media program</p> <p>Versatile product, e.g. macadamia milk</p> <p>Healthy eating messages support macadamias</p> <p>Effective use new marketing channels, e.g. social media</p> <p>Strategic, long-term marketing program in place</p> <p>Macadamias occupy a premium position</p> <p>International cooperation on health research</p> <p>World-class market intelligence and analysis</p> <p>Unprecedented demand, especially in Asia</p> <p>Extraordinary market development track record</p> <p>Almost no phytosanitary barriers for export</p> <p>Effective, professional marketing program</p> <p>Industry-run market access program</p> <p>Finding new markets and new products</p> <p>Residue testing and residue-free status</p>	<p>More market diversification needed</p> <p>Variable availability reduces food maker interest since 2011</p> <p>No international committee, market collaboration</p> <p>No AMHA to collect data for the international market</p> <p>More work on developing new markets</p> <p>Hard to maintain competitive advantage in the future</p> <p>Risk of global commoditisation as volume increases</p> <p>Need stronger understanding of demand drivers</p>
Product integrity	
<p>Australian macadamias have a good reputation</p> <p>Australian brand reputation is strong</p>	<p>Australia needs unique point of difference</p> <p>More research into health benefits</p> <p>Global food safety concerns</p> <p>Poor shelf life from all production areas</p>

Positive	Negative
Corporate services	
Comprehensive communication with industry World-class R&D and marketing Efficient levy-collection mechanism	Corporate cost recovery – quantum is too high Need to achieve greater leverage on levy Better communication of decisions and activities More transparency on decision making More timely action on R&D opportunities
Strategic drive	
Potential to guide strategy for world industry	Make best use of experienced HR in strategy delivery Don't abandon IRGs – great for project identification, development and adoption

Source: SIAP Committee Workshop, 7 September 2016; modified through industry feedback

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