Chestnut

STRATEGIC INVESTMENT PLAN

2017-2021

Hort Innovation
Strategic levy investment

CHESTNUT FUND

Content

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Introduction

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

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

As part of the role Hort Innovation 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 chestnut growers.

The chestnut SIP

Producers in the chestnut 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 chestnuts that are produced in Australia and either sold by the producer or used by the producer in the production of other goods. The new chestnut levy rate introduced on January 1, 2016 is 11 cents per kilogram.

Hort Innovation manages the proportion of chestnut levy funds directed to R&D and marketing investments (9.5 cents per kilogram). Separately, Plant Health Australia (PHA) manages plant health programs (1.5 cents per kilogram). In 2015/16, total chestnut levy receipts were approximately $92,000; $45,000 of R&D levies and $47,000 of marketing levies.

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

This plan represents the Australian chestnut 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 chestnut levy payers in the following ways: through a synthesis of preplanning tailored for the chestnut industry; preparation that includes researching 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 chestnut 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 chestnut industry SIAP constituency please visit Hort Innovation's website at www.horticulture.com.au.

Chestnut

STRATEGIC INVESTMENT PLAN 2017-2021 AT A GLANCE

POTENTIAL IMPACT OF THIS PLAN

$2.35 Million

Based on an estimated investment of $784,691 over the next five years.

OUTCOMES	STRATEGIES
Improved retail quality of chestnuts that matches consumer expectations	Work with growers and the supply chain to research solutions and ensure consumers receive fresh Australian chestnuts that meet their expectations of quality
	Research and deliver an industry-managed grower accreditation program based on agreed quality and food safety parameters
Average annual yield increased by 10 percent on mature plantings	Manage nut rot on-farm and eliminate nut rot from the supply chain
	Develop and implement orchard best management practices
	Address pest and disease issues that currently limit yield or have the potential to limit yield in the future, that is, maintain effective industry biosecurity
	Provide the industry with appropriate planting material that is disease-resistant, higher yielding, and produces nuts that meet consumer expectations, such as taste and easy peeling
Better informed industry and improved adoption of R&D outputs	Support adoption of R&D outcomes with effective extension
	Deliver meaningful data on production and planting, domestic and international markets in a timely manner
	Ensure all relevant stakeholders remain engaged through an effective communications program
	Engage with the international nut industry to maximise R&D and marketing innovation
Increased domestic demand and increased on-farm prices	Develop and execute a market strategy based on sound market intelligence that grows the Australian chestnut market
	Explore emerging opportunities, including value-added products and export market development

Chestnut
STRATEGIC INVESTMENT PLAN 2017-2021 AT A GLANCE

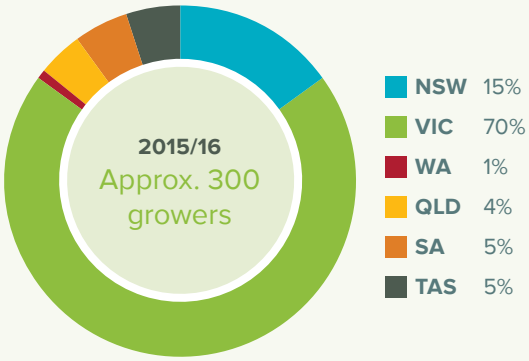
Major opportunities

- Value-added products
- Strong demand in specific demographic segments
- New consumers, including capitalising on restaurant interest
- Suitable for people with gluten-intolerance
- Capitalising on health benefits and collaboration with other nut industries to promote these
- Developing the export sector
- Collaboration with other countries on chestnut R&D and marketing
- Providing consumers with better-tasting, easy-to-peel varieties
- Raised awareness of continuous cool chain requirement for good quality chestnuts.

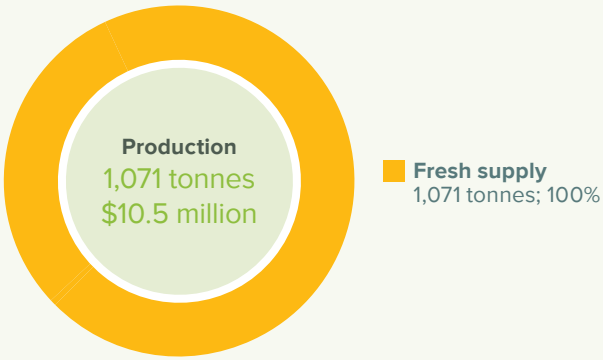
Major challenges

- Encouraging younger consumers to try chestnuts
- Differentiating Australian product from cheaper imported processed chestnuts
- Potential fresh imports (pending other countries meeting Australia's biosecurity requirements)
- Increasing production costs
- Eradication of chestnut blight
- Access to cost effective, environmentally benign pest and disease control technology
- Getting repeat sales when there is variable quality and internal rot
- Lack of agreed product quality standards
- Requirement of a continuous cool chain.

Chestnut industry size and production distribution



Chestnut supply chain and value 2014/15



SECTION ONE

Context

The Australian chestnut industry

Growing regions

Ideally, chestnuts are grown in areas that are hot in summer, cold in winter, and at least 300 metres above sea level. The majority of Australian production, about 70 per cent, is from Victoria (for example, north-east, Dandenong Ranges) with the balance spread across New South Wales/Australian Capital Territory (Batlow, Orange, Canberra, Sassafras and Tenterfield), Tasmania, South Australia (Adelaide Hills), Queensland, and south-west Western Australia.

Product availability

Fresh Australian chestnuts are harvested and in season from March to July, with some varieties available from storage through to September (Hort Innovation Working Paper No. 1, June 2016).

Grower profile

There are about 300 chestnut growers in Australia, 100 of whom are members of industry representative body Chestnuts Australia Inc. (CAI). The chestnut industry is characterised by many small family-owned farms and a handful of large production businesses that generate a significant income from chestnut production (CAI website, accessed November 2016).

Industry size and value

In 2011, about 1,000 hectares were planted to chestnuts (200,000 trees). By 2013, the area planted had increased to 1,350 hectares, and by 2015, to 1,400 hectares (SIP 2011, *Australian Horticulture Statistics Handbook 2014/15*). Further modest growth in area planted to chestnuts is anticipated.

In 2014/15, production totalled 1,071 tonnes, with a farm-gate value of $10.5 million, and a wholesale value of fresh supply of $12.3 million (*Australian Horticulture Statistics Handbook 2014/15*).

Product form and markets

Chestnuts are sold in an in-shell form. Production is focused on a strong domestic market. Limited fresh product is exported, and there is minimal processing of Australian chestnut. Australia does not currently import fresh chestnuts although it is noted that New Zealand does have access to the Australian domestic market.

The export sector accounts for approximately one per cent of Australian chestnut production. Fresh chestnuts are exported to Japan, Singapore and the Middle East (*Five-Year Strategic Investment Plan 2011–16*).

Boutique processing includes frozen, vac-packed, peeled and precooked shelf-stable chestnuts, flour, cake mixes, purees and beer.

The processed chestnuts imported from Europe and Asia are a potential source of competition for fresh Australian chestnuts. It is important that fresh Australian chestnuts are differentiated from imports, for which effective marketing is needed.

Value chain

Most fresh Australian chestnuts are sold through the wholesale markets in Sydney and Melbourne. Industry estimates that supermarkets buying direct and through the wholesale markets are the largest retail channel. Independent retailers, farmers' markets and farm-gate sales are also significant.

Although chestnuts have only been grown commercially in Australia since the late 1980s, the industry is developing its supply chains, and establishing varietal standards, best practice orchard management systems and product-handling practices. Industry members are working to continually develop fresh supply chains and build value-added businesses around supply (*Five-Year Strategic Investment Plan 2011–16*).

Global chestnut situation

Chestnuts are grown mainly in Asia and Europe. World production is dominated by China (1.65 million tonnes), South Korea (68,000 tonnes), Turkey (60,000 tonnes), Bolivia (58,000 tonnes), Italy (50,000 tonnes), Greece (30,000 tonnes), Portugal (25,000 tonnes), Japan (21,000 tonnes), Spain (17,000 tonnes), North Korea (12,000 tonnes), France (9,000 tonnes) and Albania (4,000 tonnes). On a world scale, Australia is a minor chestnut grower, producing 1,350 tonnes (FAO STAT 2015).

Major chestnut importers include Japan, France, Hong Kong, Switzerland, Brazil, United States, Germany, Austria, United Kingdom and Italy. As world trade has increased over time, demand now exceeds supply (Chestnuts NZ). Chestnut blight and gall wasp have affected supply in Europe (industry consultation).

Because low labour-cost countries produce significant volumes, Australia ideally should mechanise production if it is to compete on price in world markets and in its domestic market. This is especially so if fresh imports secure access to Australian markets.

Markets and consumers

Australian chestnuts are healthy and nutritious. They are gluten-free and salt-free; low in fat, cholesterol and sugar; and high in dietary fibre. They also have a low glycemic index (GI) for slow energy release.

Australian chestnuts are mainly sold on the domestic market. About 16 per cent of Australian households bought chestnuts in 2014/15, at an average of 310 grams per shopping trip. Per capita consumption (based on the volume supplied) was a modest 45 grams (*Australian Horticulture Statistics Handbook 2014/15*).

Most Australian consumers know little about the nutritional attributes, uses and versatility of chestnuts as a product. Traditional consumers of chestnuts are people with a European or Asian background who have historical links with the product and are familiar with its preparation, benefits and use.

Most Australian consumers know little about the nutritional attributes, uses and versatility of chestnuts as a product.

In past years, chestnuts have been positioned as an 'aspirational' or gourmet product, finding a niche in the restaurant and fine dining sector of the food service market. Consequently, dedicated 'foodies' seek them out.

The product offering from the chestnut industry is not well developed, nor are there strong, recognised brands. Unlike other horticultural products, such as apples or potatoes, chestnut varieties are not usually differentiated at the retail level. There is scope to further develop the demand for chestnuts by introducing new consumers.

Supply chain development

With a diversified and fragmented production base and a short crop season for chestnuts, most growers lack power in the supply chain. Consequently, supply chain partners dictate terms of trade. There is some cooperation between growers. One group – Premium Chestnuts Australia – selects varieties and prepares joint marketing and value-adding activities.

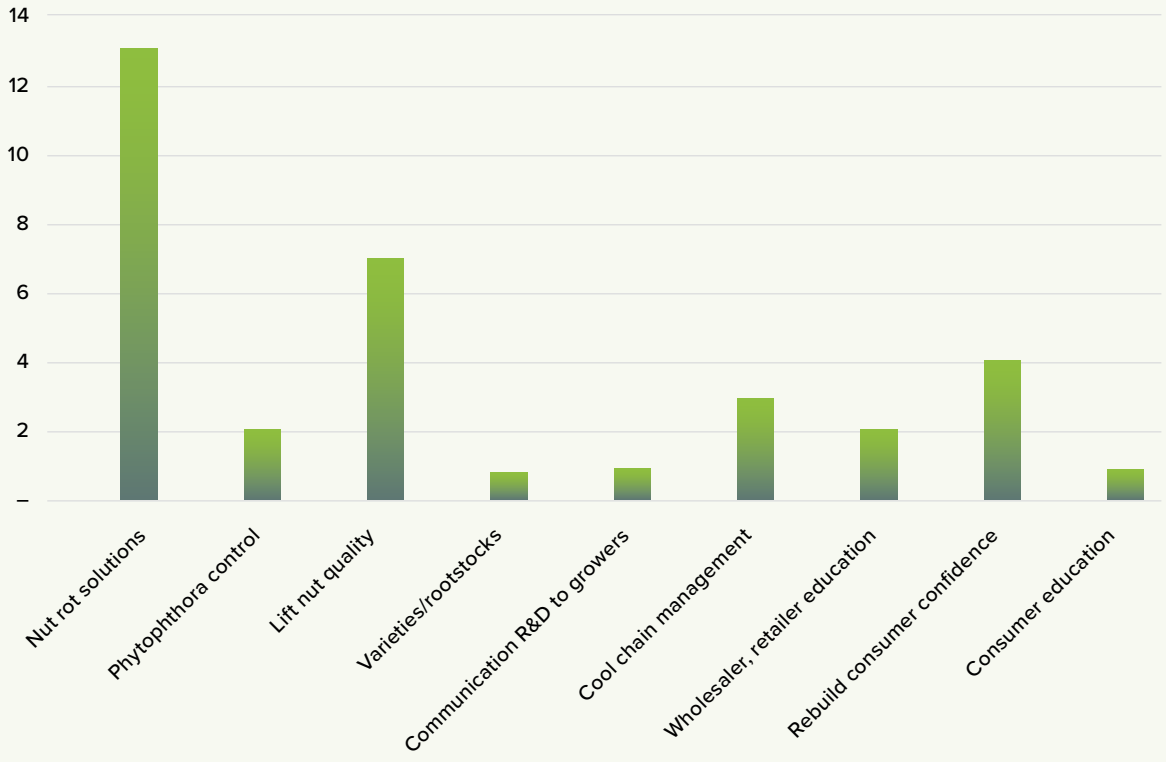
Rather than seeking specific varieties for their shops, most retail buyers depend on their wholesaler to help them with chestnut-buying decisions. Easy-peeling varieties are highly sought after by both wholesalers and consumers.

Historically, chestnut growers and their supply chain partners have had good relationships. However, there is scope to further educate wholesalers and retailers in product storage, handling, presentation and use to improve the quality of product and product information being presented to consumers (*Five-Year Strategic Investment Plan 2011–16*).

Furthermore, relationships between growers and the supply chain were damaged in 2015 and 2016 by high levels of nut rot in marketed product. Solving nut rot is the highest industry priority. Systems are needed to identify and remove affected nuts before they enter the supply chain (industry consultation).

Figure 1: Most pressing R&D or marketing needs in 2016 (number of responses)

(Source: Consultation with growers for SIP preparation, September 2016)



Production challenges

Since the early 2000s, chestnut growers have made invested significantly in their orchards to ensure the varieties they grow meet consumer needs. This includes planting or reworking trees to introduce the preferred variety, and removing or not marketing non-preferred types.

Australian growers face a number of yield-destroying pest and disease challenges. These include an incursion of chestnut blight, an exotic that caused the destruction of 4,000 trees in 2010 (*Five-Year Strategic Investment Plan 2011–16*). But progress has been significant. In August 2016, a single tree affected by chestnut blight was found (CAI website, December 2016).

Furthermore, nut rot is an endemic fungus that seriously curtails yield and product quality. Nut rot has been identified as a major priority for ongoing R&D investment (Industry consultation).

To meet another major production challenge of phytophthora, the chestnut industry needs disease-resistant rootstocks. Mechanised harvesting is improving the profitability of the chestnut industry.

Collaboration

The Australian chestnut industry collaborates on joint projects with other temperate nut industries, such as walnut, hazelnut and almond *in the project Advanced Production Systems for Temperate Nut Industries*. It also works on marketing initiatives such as Nuts for Life, which includes subtropical species such as macadamia.

Environmental scan

The environmental scan was completed through review and classification of R&D and marketing issues identified in the *Australian Chestnut Industry Five-Year Strategic Plan 2015–2020* (CAI August 2015). It was supplemented with the results of consultation completed to inform the SIP. The results of an environmental scan are shown in ***Appendix 5***.

Standout issues identified include nut rot solutions, improved nut quality, rebuilding consumer confidence, and cool chain management (***Figure 1***).

Chestnut industry risk analysis

Chestnut industry risks are summarised in ***Table 1***. The risk analysis was prepared following review of the *Australian Chestnut Industry Five-Year Strategic Plan 2015–2020* (CAI August 2015).

Table 1: Risk analysis

No.	Risk	Most likely scenario
1	Too many R&D, extension and marketing priorities spread across a levy stream that is too small	High
2	Nut rot adversely affects the quality of Australian chestnuts	High
3	Consumer confidence in Australian chestnuts damaged by poor nut quality	High
4	Australian supply of chestnuts grows faster than demand	Medium
5	A major food safety/contamination issue with resultant public awareness	Medium
6	Chestnuts adversely affected by nut allergy concerns	Medium
7	Pest/disease incursion, for example, European gall wasp, chestnut blight	Medium
8	Failure to address phytophthora root rot	Medium
9	Low-cost suppliers gain access to Australian market for fresh chestnut imports	Low
10	Industry fragmentation/lack of cohesion	Low
11	Availability of economically priced fertilisers/chemicals	Low
12	Shortage of skilled and unskilled labour	Low
13	Loss of R&D matching funding	Low

Operating environment

The chestnut industry	
Strengths	• Australia has suitable climatic conditions, know-how and infrastructure to support a vibrant and profitable chestnut industry • The industry is becoming more professional and commercially focused; marketing groups have formed and value-added products are being produced • There is strong demand for chestnuts in specific demographic segments, such as European and Asian consumers • Chestnuts are suitable as a food for gluten-intolerant people; a key strength for marketing purposes • Chestnuts are a healthy product, for example, low GI; there is scope to capitalise on advantageous reporting of the health benefits of eating chestnuts.
Weaknesses	• Return on investment of growing chestnuts is modest, and production costs are increasing • In 2010/11, about 4,000 trees affected with chestnut blight (an exotic) were removed and destroyed. In 2016, the industry is confident the incursion has been contained and is working towards eradication • The industry needs access to new environmentally benign pest and disease control technology that is cost effective to apply • A lack of consumer knowledge about chestnuts weakens consumer demand and price • Variable quality and internal rot weakens demand and works against repeat sales • Not all varieties supplied to the market meet consumer needs; there is demand for better-tasting, easy-to-peel varieties • No strong, recognised chestnut brands. Unlike other horticultural products, such as apples or potatoes, varieties are not differentiated at the retail level • There is a lack of agreed product quality standards, and a need for updated best practice guidelines • A continuous cool chain is essential for good quality chestnuts; retailers are not always aware or prepared to meet this requirement.
Opportunities	• Further develop demand by introducing new consumers to the product, including capitalising on restaurant interest in chestnut-based recipes • As supply increases, develop the export sector and capture markets, including those for fresh chestnuts in Asia • Work with other nut industries to research and promote the health benefits of nut consumption • Form effective R&D and marketing links with chestnut industries in other countries.
Threats	• Traditional and higher volume purchasers of chestnuts are ageing; younger potential consumers are not currently embracing the product • Imported processed chestnuts add diversity to the market but are significantly cheaper and could be a threat if the Australian industry is unable to market and successfully differentiate its product • Fresh imports are a potential threat if the New Zealand industry is able to address its issues with disease and other countries are able to meet Australia's strict biosecurity requirements • Industry is adversely affected by consumers' nut allergy concerns.

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SECTION TWO

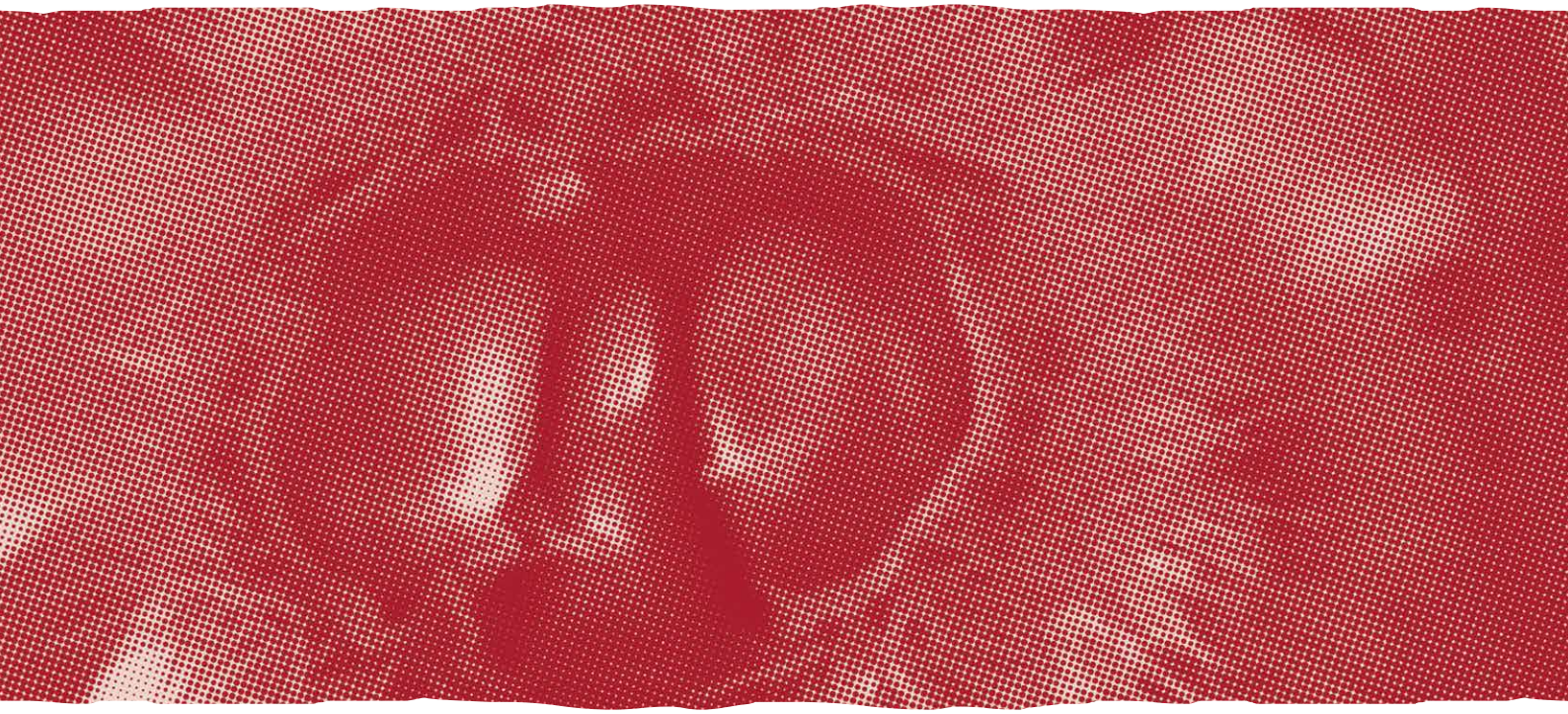
Chestnut industry outcomes

Industry outcomes

OUTCOME 1

Improved retail quality of chestnuts that matches consumer expectations

- Chestnuts that consistently meet consumer quality expectations deliver repeat sales and higher prices for growers
- In 2015 and 2016, poor quality rot-affected nuts damaged the Australian industry's reputation for providing high-quality chestnuts. Consequently, the industry needs on-farm and supply chain solutions to address poor nut quality. The industry has already invested in *Improved Postharvest Management of Chestnuts – Phase 1 & 2* (CH13005 and CH14005)
- Addressing product integrity (nut quality) is this industry's highest priority for its R&D and marketing spend. This SIP aims to eliminate nut rot from the supply chain and to support ongoing improvement in appearance while ensuring the product is safe and meets consumer quality expectations



OUTCOME 2

Average industry yield increased by 10 per cent on mature plantings

- This outcome focuses on crop production and it addresses:
  - **Cost-effective pest and disease control, including nut rot, surface mould and phytophthora. Proposed investment builds on previous levy-funded projects: Biology and Management of Nut Rot in Chestnuts (CH07007), Desktop Analysis and Literature Review of Chestnut Rot (CH13002), Review of Phytophthora Root Rot in Chestnuts (CH14002), and investment in chemical Minor Use Permits**
  - **Planting material, including varieties and rootstocks that are disease-resistant, high-yielding and produce chestnuts that appeal to consumers, that is, they are tasty and easy to peel**
  - **Orchard best management practices that are extended through the industry's Communication and Adoption project by the Industry Development Officer. This proposed investment builds on the 2012 levy-funded Australian Chestnut Growers Handbook (CH12003)**
- Following its 2011 experience with an incursion and localised establishment of chestnut blight, the industry places a high priority on pest/disease control and biosecurity management. This high-priority outcome includes investment in a biosecurity plan, manuals, surveillance and a disease-reporting system

OUTCOME 3

Better informed industry and improved adoption of R&D outputs

- A better informed industry and improved adoption of R&D outputs encompasses:
  - **Extension based on established successful systems and adoption pathways**
  - **Collection of production data to inform industry decision making**
  - **Continuation of engaging communication programs that are well regarded by growers**
  - **Skill and capacity development in production, marketing and leadership**
  - **Building linkages with the international chestnut industry to facilitate a deeper understanding of industry trends and developments**
- The industry is committed to a three-year communication and adoption project that commenced in 2016. The project will ensure that research generated by the SIP-managed R&D program, multi-industry projects, and other pools and programs is adopted by large and small chestnut growers
- The communication and adoption project will be responsible for implementing crop production best practice, extension, and for working with growers to implement supply chain solutions for poor-quality nuts. Industry development and data insights was identified as a medium program priority

OUTCOME 4

Increased domestic demand and increased on-farm prices

- Marketing provides the 'pull through' needed for chestnuts. While the nut is well understood and enjoyed by Australians of European or Asian heritage, it is largely unknown and untested by many in the Australian community. Furthermore, poor-quality nuts have led to some retailers discontinuing the stocking of chestnuts and some consumers losing faith in the product
- Consequently, the SIP describes the development and execution of a market strategy to rebuild consumer confidence and grow Australian chestnut sales, along with a strategy to explore emerging opportunities in value adding and fresh chestnut export
- This outcome builds on previous marketing investment by the industry, investigations of value-adding opportunities, and industry export initiatives
- Market development, education and rebuilding consumer confidence was identified as a high priority by the chestnut industry

SECTION THREE

3 Chestnut industry priorities

Industry investment priorities

OUTCOME 1 – Improved retail quality of chestnuts that matches consumer expectations	
STRATEGIES	**POSSIBLE DELIVERABLES**
Work with growers and the supply chain to research solutions and ensure consumers receive fresh Australian chestnuts that meet their expectations of quality	• Cool chain research that has addressed gaps in industry knowledge • Grower adoption of production, harvest, grading and storage best practice based on research outcomes • The supply chain understands chestnut handling, management and presentation, and the cool chain is maintained from harvest through to consumer • Supply chain partners keep chestnuts refrigerated
Research and deliver an industry-managed grower accreditation program based on agreed quality and food safety parameters	• Quality parameters developed and in place for fresh Australian chestnuts • Food safety provisions are incorporated into chestnut quality systems • Grower accreditation program prepared and implemented • Accreditation program supported by wholesalers and 50 per cent of growers by volume

OUTCOME 2 – Average industry yield increased by 10 per cent on mature plantings	
STRATEGIES	**POSSIBLE DELIVERABLES**
Manage nut rot on-farm and eliminate nut rot from the supply chain	• Fundamental understanding of nut rot and cost-effective management solutions • A better understanding of nut rot triggers and the role of good orchard hygiene • Cost-effective disease management and control measures, including chemicals and a preliminary understanding of the potential of biological control agents • Quality systems to prevent/limit rot-affected nuts entering the supply chain • Joint nut rot research projects with other countries affected by the disease, for example, New Zealand, Switzerland, Italy, France and Chile
Develop and implement orchard best management practices	• Best management practice guides prepared and adopted by the industry. Guidelines address up-to-date information on pests/diseases, water application, climate variability, nutrition, soil health, pruning, harvest and orchard mechanisation
Address pest and disease issues that currently limit yield or have the potential to limit yield in the future, that is, maintain effective industry biosecurity	• An understanding of phytophthora triggers, management and control delivered cost effectively through a multi-industry project • An understanding of surface mould triggers, management and control • An up-to-date understanding of bubble bark management techniques • Access to appropriate chemicals as per the industry Strategic Agrichemical Review Process (SARP) • A biosecurity plan for chestnuts building on the PHA plan for the nut industries • A biosecurity manual for chestnut growers to use on-farm
Provide the industry with appropriate planting material that is disease-resistant, higher yielding, and produces nuts that meet consumer expectations, such as taste and easy peeling	• A better understanding of the causes and possible solutions for unexplained tree death; is it disease related, is it scion-rootstock incompatibility, rootstocks? • Premium varieties and rootstocks, with information on performance communicated to Australian chestnut growers • In partnership with the nursery industry, ensure all planting material is well structured and free of pests and diseases

OUTCOME 3 – Better informed industry and improved adoption of R&D outputs	
STRATEGIES	**POSSIBLE DELIVERABLES**
Support adoption of R&D outputs with effective extension	• Extension publications, products and services that include fact sheets, field days, workshops and training sessions (based on adoption gaps and new R&D information and preferred extension strategies) • Grower groups to work together to find solutions to common problems, develop/test new technologies and management practices. Consideration to be given to an industry benchmarking program • New growers introduced to the industry via the existing *Chestnut Handbook* and best practice guides
Deliver meaningful data on production and planting, domestic and international markets in a timely manner	• Data addressing production by area (hectares) and volume (tonnes), trees by variety and spacing, production costs, varieties grown, disease levels and economic losses incurred, grower numbers, volume of chestnuts sold by channel, exports by destination, imports of fresh and processed nuts, data on the balance of world supply and demand
Ensure all relevant stakeholders remain engaged through an effective communications program	• Effective communications delivered to industry as per a Communication Strategy, which may include technical bulletins, newsletters with project updates, best practice guides, biosecurity manuals, and a relevant website
Engage with the international nut industry to maximise R&D and marketing innovation	• Possible international travel to major production areas and conferences to understand industry trends and developments

OUTCOME 4 – Increased domestic demand and increased on-farm prices	
STRATEGIES	**POSSIBLE DELIVERABLES**
Develop and execute a market strategy based on sound market intelligence that grows the Australian chestnut market	• Market research reports focusing on the domestic chestnut market • Market strategy that identifies segments with the highest return for growers, including value-adding opportunities • Marketing collateral to help realise identified opportunities, for example, factual information about health benefits, consumer handling guides, best use for each of the varieties (boil versus easy-peel), and recipe cards • A program of in-store promotions and chef/restaurant endorsements • Consumer communications delivered through a dedicated consumer website, social media and the supply chain. Messages will have included storage to maximise freshness, new uses for chestnuts, health benefits associated with consumption • Differentiated Australian chestnuts at retail; an examination of the potential for brand development based on premium varieties and implementation of country-of-origin labelling
Explore emerging opportunities, including value-added products and export market development	• One feasibility report prepared on either a new technology or market opportunity for value-added chestnut products • An investigation of current and potential packaging material to ensure nut quality at retail • Market research on key international chestnut markets • Information prepared and disseminated to support removal of market access barriers, especially in relation to Europe

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

The alignment of the chestnut SIP outcomes to the Hort Innovation investment priorities, and consequently, the Australian Government's Rural RD&E Priorities and National Science and Research Priorities are shown in the ***Table 2***.

Table 2: Alignment of chestnut SIP outcomes to the Hort Innovation investment priorities

Hort Innovation investment priorities	Chestnut SIP outcomes
Support industry efficiency and sustainability	Average industry yield increased by 10 per cent on mature plantings
Improve productivity of the supply chain	
Grow the horticulture value chain capacity	Better informed industry and improved adoption of R&D outputs
Drive long-term domestic and export growth	Improved retail quality of chestnuts that matches consumer expectations
	Increased domestic demand and increased on-farm prices
Lead strategically to enhance the development of the Australian horticulture industry through operational excellence	Enabler

4

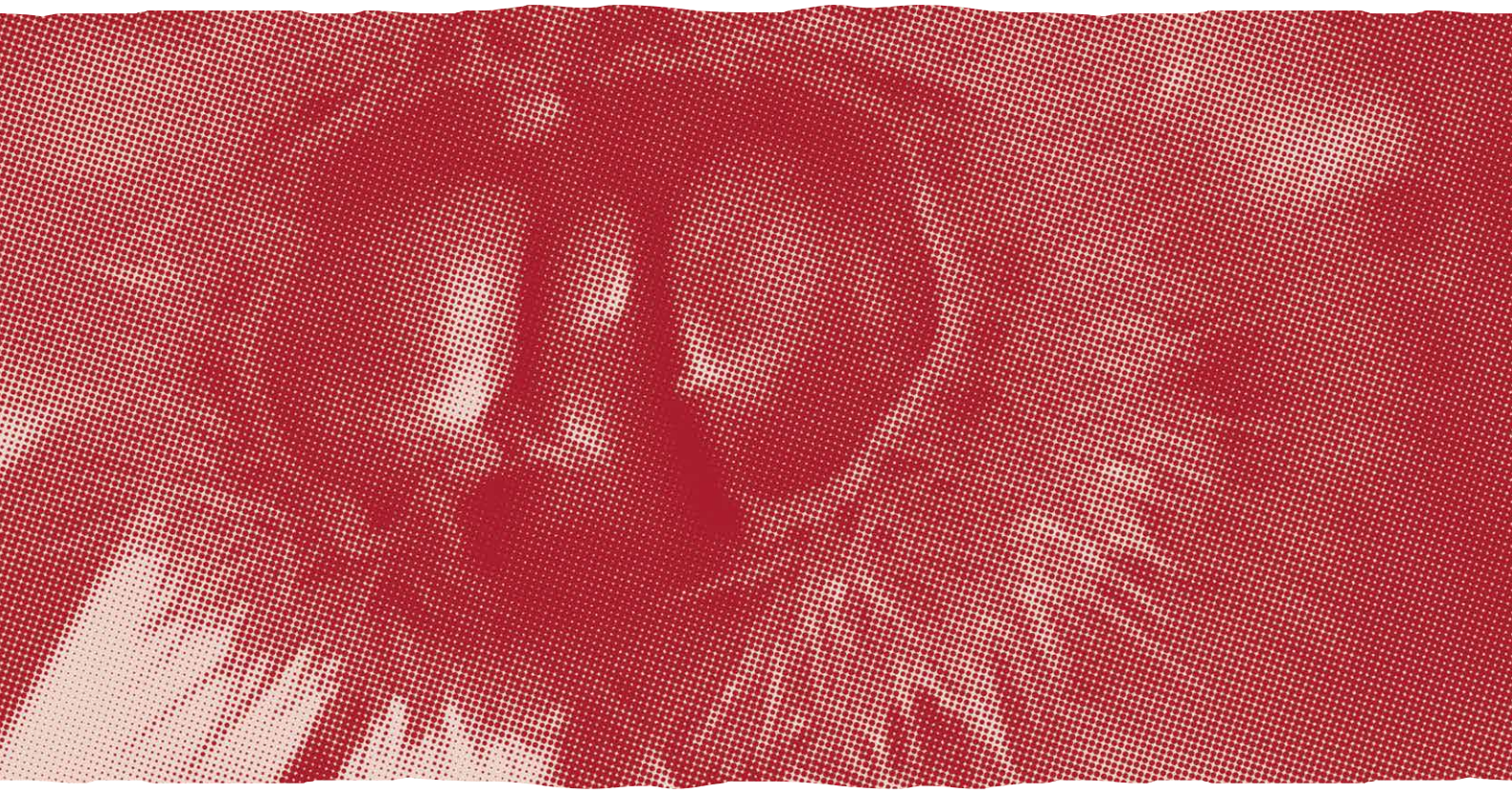
SECTION FOUR

Chestnut industry monitoring and evaluation

Chestnut SIP monitoring, evaluation and reporting

A SIP program logic and monitoring and evaluation (M&E) plan has been developed for the chestnut 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 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.

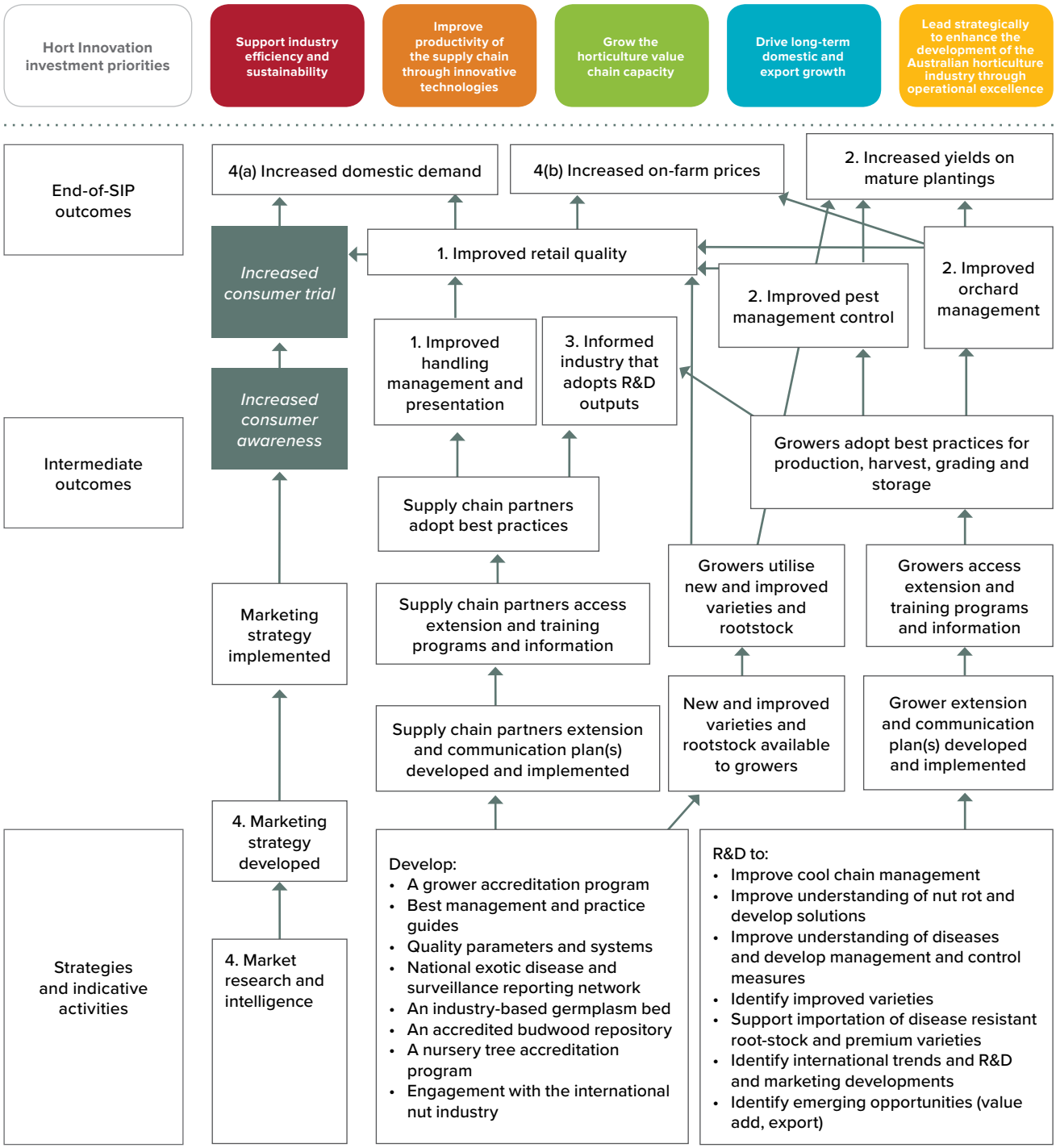
The SIP outcomes and strategies will be used to inform investments in individual projects to deliver on the SIP. The results of M&E will be used to reflect on the results of investments and in decision making. Hort Innovation will facilitate the regular review of SIPs to ensure they remain relevant to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



Chestnut SIP logic

An indicative chestnut 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 SIP but necessary conditions for the achievement of expected outcomes.

Figure 3: Chestnut SIP logic



Chestnut SIP M&E plan

The chestnut monitoring and evaluation (M&E) plan is shown in ***Table 3***. The table includes key performance indicators (KPIs) and data-collection methods at a macro/industry (trend) level and at more specific SIP level/s.

Table 3: Monitoring and evaluation plan for the chestnut SIP

Objectives	Strategies	KPIs	Data collection methods and sources
Improved retail quality of chestnuts that matches consumer expectations	Work with growers and the supply chain to research solutions and ensure consumers receive fresh Australian chestnuts that meet their quality expectations Research and deliver an industry-managed grower accreditation program based on agreed quality and food safety parameters	• Chestnuts presented for retail are free of nut rot • Quality systems and standards developed across the value chain • Grower accreditation program established • 50 per cent of growers (by volume) are participating in the quality standards program, and evidence of quality standards being met • Evidence of wholesalers being supportive of the quality standards program	• Annual survey of wholesalers • Survey of growers to determine uptake of the quality standards program • Quality standards program records
Average industry yield increased by 10 per cent on mature plantings	Manage nut rot on-farm and eliminate nut rot from the supply chain Develop and implement orchard best management practices Address pest and disease issues that currently limit yield or have the potential to limit yield in the future, for example, maintain effective industry biosecurity Provide the industry with appropriate planting material that is disease-resistant, higher yielding, and produces nuts that meet consumer expectations, such as taste and easy peeling	• Increased average industry yield on mature plantings (10 per cent increase to 2.2 tonnes per hectare) • Best management practice guides published • Imported improved varieties (higher yielding, improved taste and easier peeling) tested by industry • On-farm biosecurity manual developed and evidence of on-farm uptake	• Survey of growers to determine average industry yield on mature plantings in 2021 • R&D project records

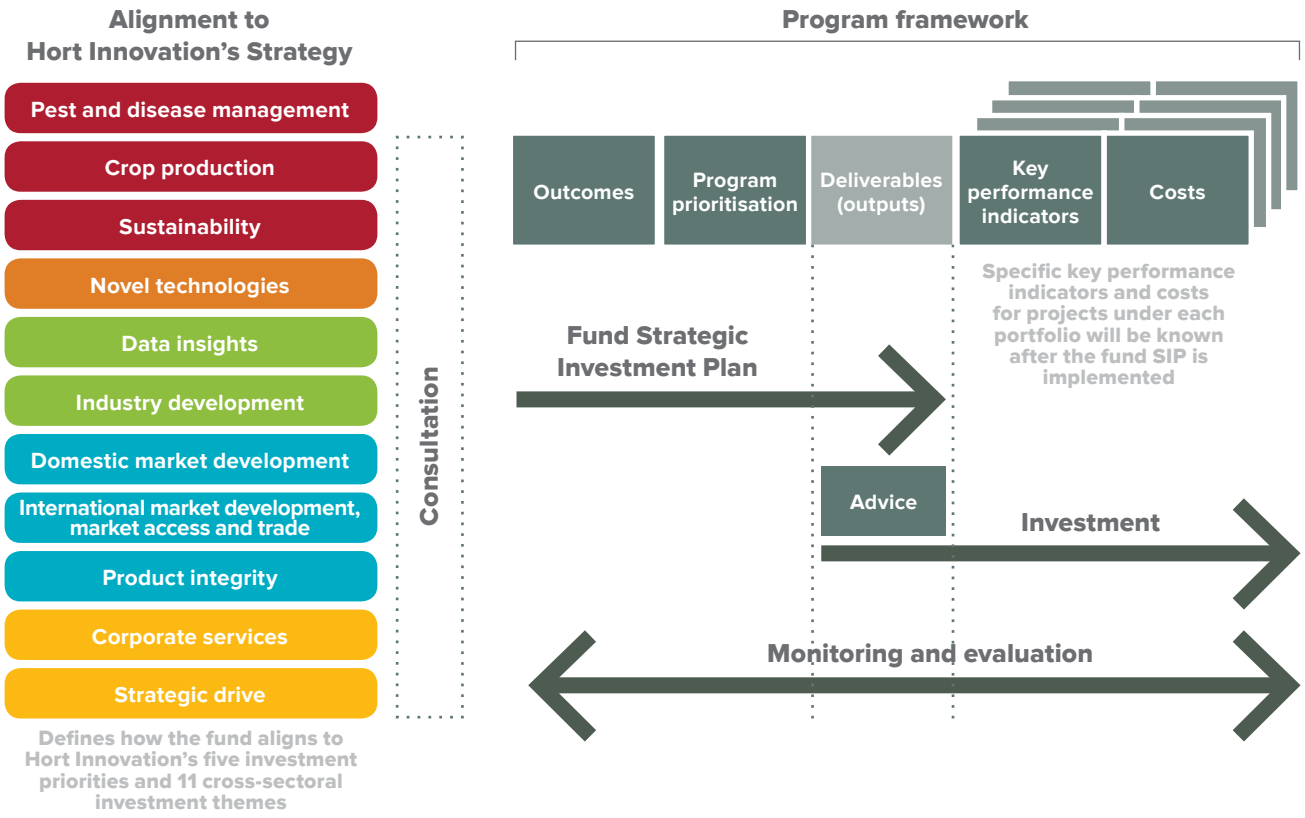
Objectives	Strategies	KPIs	Data collection methods and sources
Better informed industry and improved adoption of R&D outputs	Support adoption of R&D outputs with effective extension Deliver meaningful data on production and planting in domestic and international markets in a timely manner Ensure all relevant stakeholders remain engaged through an effective communications program Engage with the international nut industry to maximise R&D and marketing innovation	• Growers representing 50 per cent of production volume are aware and informed of relevant R&D projects, evidence of a change in knowledge, and an intention to adopt proven research outcomes • System established to collect and report production and market data • Extension and communication developed, such as a stakeholder engagement plan, including growers and supply chain partners • International nut industry engagement plan developed	• Survey of growers to determine R&D project awareness, knowledge and willingness to adopt/ adoption of new practices at start and end of SIP • Production and market data • R&D project records • Industry survey to measure extension/ communication outputs reach and uptake
Increased domestic demand and increased on-farm prices	Develop and execute a market strategy based on sound market intelligence that grows the Australian chestnut market Explore emerging opportunities, including value-added products and export market development	• An increase in per capita consumption of chestnuts (based on fresh supply) at prices that are equivalent or better than 2014 on-farm prices (baselines to be established)	• *Australian Horticulture Statistics Handbook 2014/15* reports chestnut per capita consumption (prices determined informally by growers on SIAP or purchase of Ausmarket data)

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 assist Hort Innovation to prioritise and implement the specific industry R&D, extension and marketing programs.

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

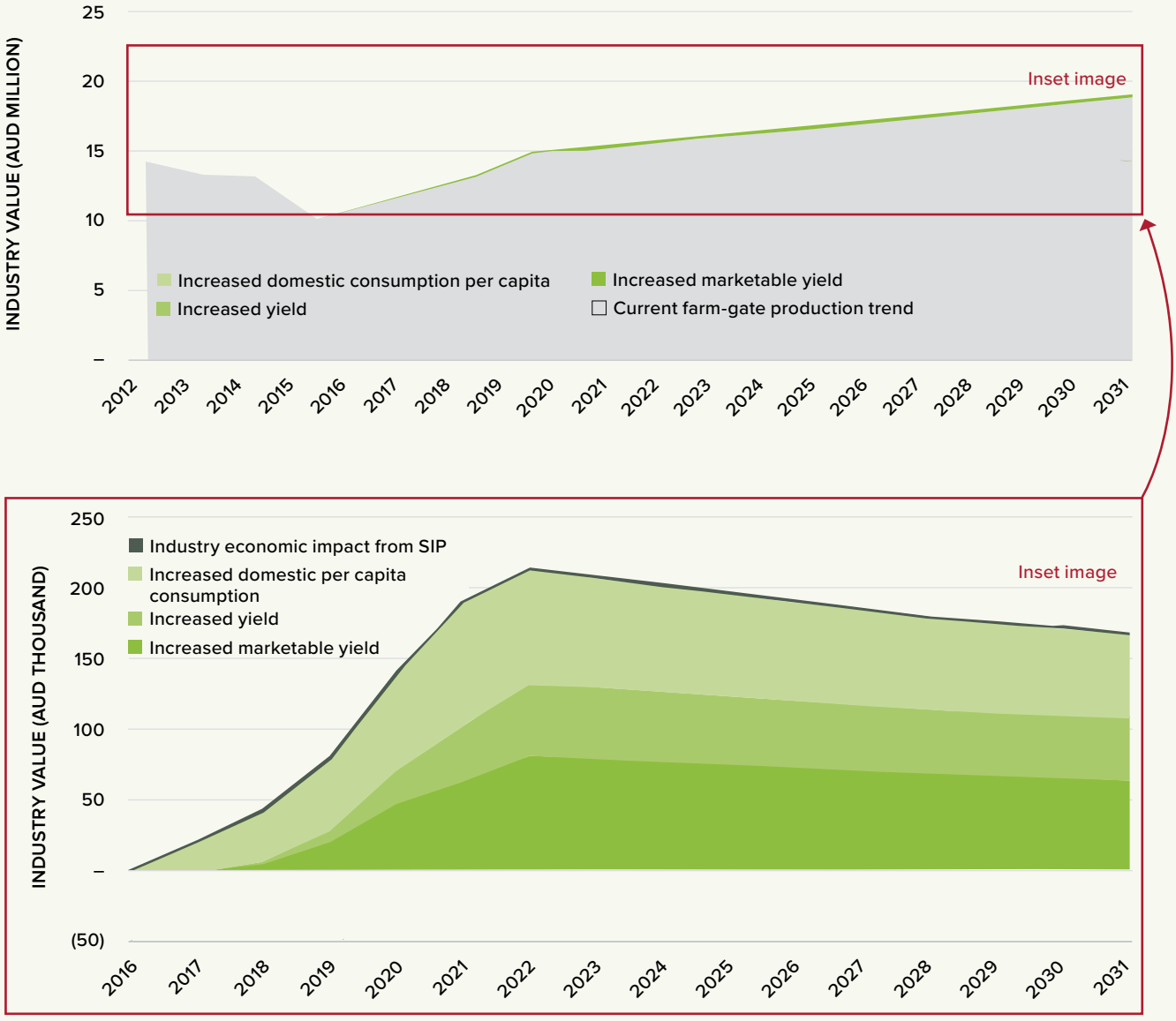
Figure 4: Hort Innovation's program framework



SECTION FIVE

5 Impact assessment

Figure 5: Economic benefit from investment in the SIP



An independent assessment of the potential economic impacts from investment into the chestnut SIP indicated a positive return on investment for the industry ***(Figure 5)***. The anticipated investment of $784,691 over the next five years in R&D, extension and marketing activities for chestnuts is expected to generate $2.35 million in net benefits for the industry, representing a benefit cost ratio of 3.00 times to the sector.

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

Table 4: 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: Improved retail quality of chestnuts that matches consumer expectations	• Solutions to ensure consumers receive fresh Australian chestnuts that meet their quality expectations • Research and deliver an industry managed grower accreditation program based on agreed quality and food safety parameters	$261,564	$848,264	3.24
OUTCOME 2: Average industry yield increased by 10 per cent on mature plantings	• Manage pests and diseases through industry best practice and the provision of disease resistant planting materiel that produces higher yielding and higher quality chestnuts	$261,564	$542,096	2.07
OUTCOME 3: Better informed industry and improved adoption of R&D outputs	• Communication and extension activities, international engagements, and data and insight projects	Incorporated into other outcomes	Incorporated into other outcomes	Incorporated into other outcomes
OUTCOME 4: Increased domestic demand and increased on-farm prices	• Develop and execute a market strategy that includes in-store promotions, chef/ restaurant endorsements, and consumer communications • New value added chestnut products; improved packaging; and information to support removal of market access barriers	$261,564	$962,857	3.68

The quantified impact associated with Outcome 1 is:

- Increased marketable yield from implementation of orchard management practices that decrease the impact of nut rot.

The quantified impact associated with Outcome 2 is:

- Increased yields from better orchard management practices and planting of new varieties capable of higher yields. Impacts from new varieties will not be realised for at least 10 years after first plantings.

The quantified impacts associated with Outcome 3 support the adoption and implementation of R&D and marketing from Outcomes 1-2 and 4 and thus contributes to the delivery of all quantified impacts.

The quantified impacts associated with Outcome 4 is:

- Increased domestic consumption per capita, driven by marketing activities.

6

SECTION SIX

Risk management

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

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

Risks relevant to implementation of the SIP are limited to:

- Too many R&D, extension and marketing priorities spread across a levy stream that is too small.

Figure 6: SIP development process

APPENDIX 1: Process to develop this plan

The SIP was developed by the Australian chestnut industry through the four-stage process formulated by Hort Innovation and illustrated in ***Figure 6***.

Preplanning activities included review of relevant literature, analysis of past investments, preparation of an industry profile, and engagement with the SIAP and CAI via a workshop held in conjunction with the Tri-Nut Conference in Launceston, Tasmania, on September 2, 2016.

The literature review focused on the previous CAI and HAL *Five-Year Strategic Investment Plan 2011–16*, CAI *Five-Year Strategic Plan 2015–20*, CAI *Marketing Strategic Program 2015–18*, CAI *Key R&D Investment Strategies 2015–16*, CAI *Key Marketing Investment Program 2015–16*, chestnut industry strategic planning process documentation, and CAI *Strategic Plan 2006–10*.

Preparation tasks included gathering input and data to inform the SIP, completion of an environmental scan, review of consumer and retailer trends, and a scan of innovative technology relevant to the chestnut industry. Chestnut growers were consulted on levy investment priorities at the Tri-Nut Conference, and follow-up interviews were completed with chestnut growers who were unable to attend the conference. An online version of the consultation survey was posted on SurveyMonkey and notification of the opportunity to contribute was made via the CAI *Nuts and Burrs* newsletter. The *Nuts and Burrs* notification also included Michael Clarke's contact details so that direct contact could be made with the consultant if this was preferred.

Subsequent SIP execution and validation included circulation of a first draft SIP to the SIAP, CAI and other known industry members, with a request to forward the document to whomever else might be interested in providing comment. The first draft was circulated on December 13, 2016, with a request to provide comment by January 31, 2017.

A SIAP/CAI workshop to review a first draft of the plan was held on February 27, 2017 at Best Western Airport Motel, 33 Ardlie Street, Attwood, Victoria. It included review of outcomes, strategies, possible deliverables and KPIs. The workshop confirmed levy investment priorities developed through consultation.

A second draft chestnut industry SIP was prepared in March. Preparation of the second draft included refinement of strategy, testing of strategy using benefit cost analysis, preparation of a monitoring and evaluation framework, development or relevant summaries, and an SIP Communication Plan.

Validation was completed through posting the draft on the Hort Innovation website with an invitation sent to chestnut growers by email to comment.

APPENDIX 2: Consultation

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

Name	Industry role
David McIntyre	SIAP member
Heather Kane	SIAP member
Luciano Cester	SIAP member
Don Nightingale	SIAP member
Jane Casey	SIAP member
Tom Robertson	SIAP member
Chris Dikkenberg	SIAP member
Brian Casey	CAI Chair
Adam Gatford	CAI Deputy Chair
Bill Connoley	Grower – contributed to priority setting Tri-Nut Conference
Jan Connoley	Grower – contributed to priority setting Tri-Nut Conference
Richard Guthrie	Orchard Manager for Don Nightingale – Tri-Nut Conference
Jacquelyn Simpson	Researcher NSW DPI – Tri-Nut Conference
Lisa Beddone	Grower – contributed to priority setting Tri-Nut Conference
John Kane	Grower – contributed to priority setting Tri-Nut Conference
Joy Hall	Grower – contributed to priority setting Tri-Nut Conference
Helen McIntyre	Grower – contributed to priority setting Tri-Nut Conference
Trevor Ranford	Industry Development Officer, CAI
Tanya Edwards	Communications, CAI

No responses were received from the online survey posted on SurveyMonkey and advertised in *Nuts and Burrs*.

APPENDIX 3: References

FAO STAT (2015) http://faostat3.fao.org/home/index.html#DOWNLOAD

Chestnuts Australia Inc. (August 2015) Five-Year Strategic Plan 2015-2020

Chestnuts Australia Inc. (2015) Marketing Strategic Program 2015–2018

Chestnuts Australia Inc. (2015) Key R&D Investment Strategies 2015–16

Chestnuts Australia Inc. (2015) Key Marketing Investment Program 2015–16

Chestnuts Australia Inc. (2007) Strategic Plan 2006–2010

Chestnut Industry Strategic Planning Process (2014)

Chestnuts Australia Inc. and HAL (June 2011) Five-Year Strategic Investment Plan 2011–2016

Chestnuts NZ (accessed December 2016) New Zealand Chestnut Industry Fact Sheet http://www.nzcc.org.nz/factsheet.html

Hort Innovation Strategic Plan (April 2016)

Hort Innovation (2016) Australian Horticulture Statistics Handbook 2014/15

Premium Chestnuts Australia (accessed 13 December 2016) http://www.premiumchestnuts.com.au/about-premium-chestnuts.html

APPENDIX 4:
Logic hierarchy

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

APPENDIX 5:
Environmental scan results

Pest and disease management

- Nut rot must be managed on-farm and before nuts enter the supply chain
- Nut rot requires both basic research (for example, triggers, conditions for growth) and grower education
- Nut rot is not a one-off seasonal problem – both 2015 and 2016 were bad years. It is also increasing in Europe
- Nut rot solutions must be cost effective to implement
- Nut rot incidence might be reduced with good orchard hygiene, harvesting fallen nuts quickly, cooling and maintaining the cool chain
- Nut rot – good supply-chain management is key, so treat the product like a perishable and manage the cool chain
- We need a cure for all rots – those that affect limbs and roots
- Economic analysis of chemical use – is there a payback from application?

Crop production

- Productivity improvement is needed to lift low profit levels; this can be achieved through extension
- Phytophthora-resistant rootstocks are needed for the chestnut industry
- Variety/rootstock compatibility need development and testing
- Chestnut industry has done very little research on rootstocks; need more robust rootstocks and dwarfing rootstocks
- Unexplained tree deaths need to be researched; can be up to 25 trees in a 100 tree block can be lost
- Robust biosecurity is needed to ensure sustainable production, that is, no more incursions such as chestnut blight
- Incursion and establishment of European gall wasp would have a major impact on the Australian industry

Novel technologies

- Robotics, to reduce the industry's labour requirements
- Technology to test for internal nut rot
- Orchard and postharvest mechanisation; previous levy investment in a mechanised peeler trial (CH09006)

Industry development and data insights

- We must communicate research solutions to our growers
- Adoption of best practice production, harvest and postharvest techniques is essential to lift grower productivity
- The industry is committed to a three-year communication and adoption project that commenced in 2016
- Better industry data is required to inform decision making

Domestic market development

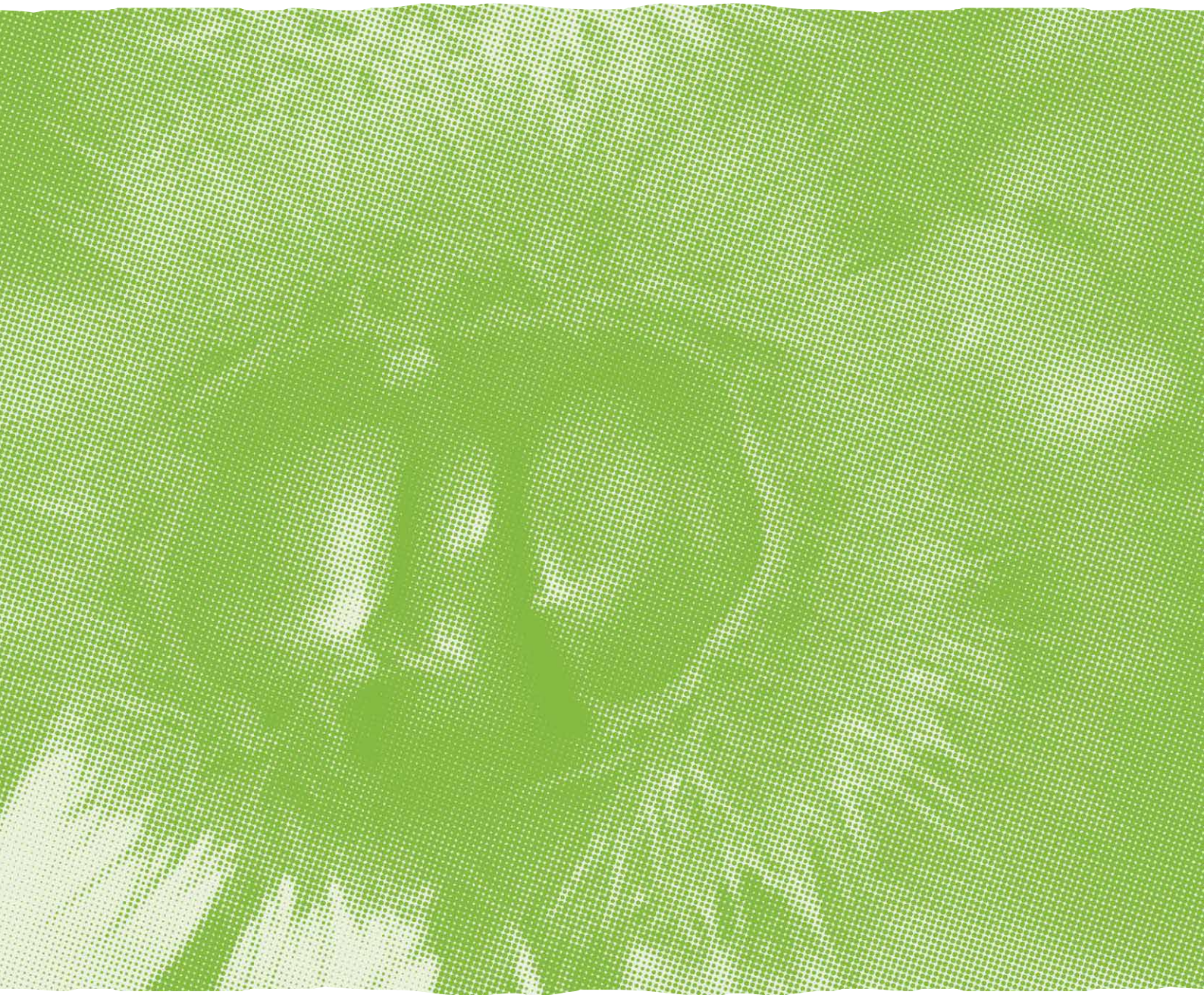
- We need to rebuild consumer confidence destroyed by poor quality and nut rot in 2015 and 2016
- Retailer education on handling, management and presentation of chestnuts is required
- Cool chain management to improve product quality
- Drive demand by continuing to educate Australian consumers in the use and preparation of chestnuts
- Promote health benefits associated with chestnut consumption

International market development, market access and trade

- Export sales dependent on a favourable exchange rate
- Export might be more important as the production base grows
- Market research is required to target 'best bet' export markets

Product integrity and processing
• Must improve the average quality of product presented to the market
• Very difficult to promote chestnuts and grow the market when quality is poor/variable
• Cool chain maintenance is essential; retailers not always aware or willing to address this requirement
• Research is needed on market needs and formulations for value-added chestnut products
• Economic analysis of offshore processing, and removing medium and small nuts from the market place
Corporate services/Strategic drive
• Ensure the correct levy is collected from all chestnut growers
• Demonstrate a strong return on investment on levy funds to meet the expectations of levy payers and government

Source: CAI August 2015 and SIP consultation with growers in September and December 2016



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