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A sustainability framework for horticulture (HA19001) is an initiative by Hort Innovation — a not-for-profit, grower-owned company that delivers more than \$120 million in research, development and marketing activities on behalf of Australian growers each year. This whole-of-horticulture project has been funded by Hort Innovation using Australian Government contributions.

Sustainable horticulture

The interconnection between economic, social and environmental outcomes are core to the sustainability of Australian-grown horticulture and its people.

A sustainable horticulture sector is one that is vibrant and prosperous, produces food to nourish and plants to nurture people and communities worldwide, provides fulfilling employment and protects our environment now and for future generations.

This sustainability framework has identified four pillars with seventeen topics significant to the sustainable production of fruits, vegetables, nuts and amenity horticulture in Australia.



Nourish & Nurture recognises the role of Australian horticultural produce in improving diets, health and wellbeing by providing safe, quality food and greenlife.

People & Enterprise identifies the strong links between the people, enterprises, communities and economic value of Australian-grown horticulture.

Planet & Resources focusses on reducing any impacts on the natural environment and on the dependence of horticultural production on resources, biosecurity and resilience to climatic variability.

Less waste is about reducing all forms of waste in horticultural production.



A sustainability framework for Australian-grown horticulture

Hort Innovation has worked with Australian horticulture's industries and stakeholders to develop this framework for understanding and measuring the sustainability of Australian-grown horticultural production and setting goals for the future.

The significant sustainability topics for Australian-grown horticulture were identified through a materiality assessment process. Over 600 internal and external stakeholders provided input through surveys, interviews and workshops and a detailed review was undertaken of stakeholders' published plans and sustainability objectives. The project then worked with individual industries to review and iteratively develop sustainability goals for each topic. Indicators have been drawn as a best fit between available data and the goals and further refined through industry input.

This research was conducted from October 2019 to April 2021 with multiple points for input from horticultural industries and their stakeholders.

How will the horticulture sustainability framework be used?

This sustainability framework provides a logical process to measure how Australian horticulture is tracking on key sustainability issues. With this information, Australian horticulture, its industries and businesses can:

- ► Tell their story of sustainable production
- Protect and grow access to investment and finance
- ► Target research to improve practice
- Work together on common challenges across the sector
- Measure and track progress to sustainability
- Work towards safe, ethical, and sustainable production practices
- ▶ Strengthen relationships and transparency with stakeholders.

The sustainability framework can be used at a whole-of-horticulture level, industry level or business level. A whole-of-horticulture sustainability report can be developed by compiling data and case studies for each indicator.

Hort Innovation intends to use the sustainability framework to inform the next Strategic Investment Planning process.

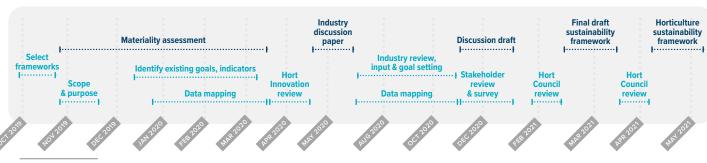
Each horticultural industry will determine how they will use this framework. Some industries have started using the information to develop their own industry approach. Industries may choose to set industry specific targets and timeframes.

WHY A SUSTAINABILITY FRAMEWORK?

In the globalised supply chain, consumers are showing an increasing interest in understanding more about where their food and greenlife products come from and how they are produced.

Similarly, supply chain companies and their shareholders, markets and investors are seeking evidence of high standards of product safety, workplace ethics and environmental care. Three quarters of Australian businesses have metrics to measure environmental sustainability. 27% intend to make their supply chain more environmentally sustainable in the next one to two years.¹

Hort Innovation's Strategy 2019-2023 committed to developing a sustainability framework for Australian horticulture, to help the sector proactively manage emerging issues now, and in the future and set benchmarks to show progress over time.





Australian-grown horticulture

Horticulture is a highly diverse sector, comprising over 40 industries operating in widely differing climatic zones and landscapes to produce food to nourish and plants to nurture Australian and worldwide communities.

Sustainability is core to these enterprises. People and the natural environment are integral to both production and lifestyles of producers.

12,000

HORTICULTURAL FARMS
AND NURSERIES

72,000 +

PEOPLE EMPLOYED

\$15.4 billion

WHOLESALE VALUE
OF PRODUCE PER YEAR

2.5 million

TONNES OF FRUIT

3.7 million

TONNES OF VEGETABLES

0.2 million

TONNE OF NUTS

\$3,136 million

OF NURSERY PLANTS, TURF AND CUT FLOWERS

Australian Horticulture Statistics Handbook 2019/20



^{*} Comprised of the crops included in the national vegetable levy

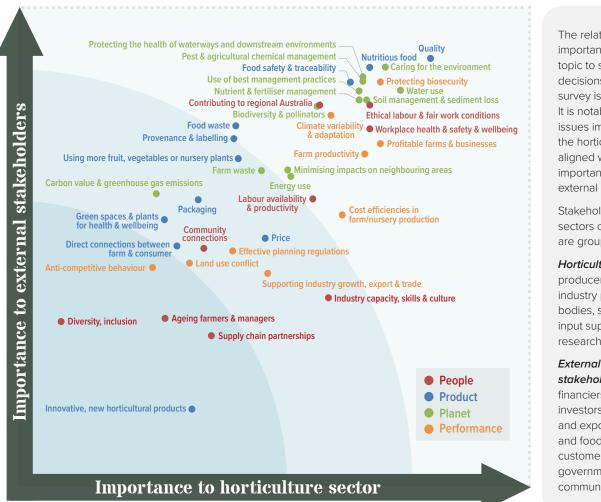


What is important to Australian horticulture's stakeholders?

The sustainability topics that most influence the decisions of people interested in Australian horticulture were identified through a materiality assessment guided by the Global Reporting Initiative's (GRI) sustainability reporting standards and a modified AccountAbility test.

Findings are detailed in the report, published May 2020: What is important to Australian horticulture's stakeholders?

Stakeholders' perspectives were explored through review of stakeholders' published plans and sustainability goals, industry information including industry Strategic Investment Plans, industry programs such as EcoHort, Hort360, EnviroVeg, Horticulture for Tomorrow, Fair Farms and research reports and global initiatives such as the United Nations' Sustainable Development Goals and the Global Reporting Initiative. A list of potential material topics was iteratively refined through this process. Interviews of industry bodies, researchers and key supply chain stakeholders, an online survey, peer review and a project reference group gathered direct input on these topics from over 600 stakeholders.



The relative importance of each topic to stakeholder's decisions found in the survey is shown at left. It is notable that the issues important to the horticulture sector aligned with those important to their external stakeholders.

Stakeholder sectors consulted are grouped as:

Horticulture sector:

producers, employees, industry peak bodies, service and input suppliers and researchers.

stakeholders:

financiers and investors, marketers and exporters, retailers and food service customers, consumers, government and communities.

The material topics identified were then grouped into themes and existing industry goals were mapped to the topics to inform a series of iterative discussions and meetings with horticultural industries. Industry input led to regrouping the topics into four pillars, refining seventeen topics and setting goals for each topic. The document review and other stakeholder input was again reviewed to identify the importance of each of these topics to each stakeholder sector as shown.



Materiality across the horticulture supply chain

What is important to stakeholders' decisions about Australian horticultural produce?

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Nourish & Nurture													
Food to nourish people	**	**	*	**	*		*	*	**		*	**	2 386.
Plants to nurture communities	**	*	*	*					**			*	11 marent 18 mm
Safe, traceable, quality	**	**	**	*	**	**	**	**	**	*	**	**	2
People & Enterprise													
Productive, profitable growers	**	*	**	*	*	**	**	**	*	*		*	2 and
Safe & ethical work	**	**	**	*	*	*	**	**	**	**	*	**	8 10021100
Leadership & governance	*	*	**	*	*	**	*	*		*	*	*	5 may. 16 mayarin Y
Innovation	*	*	*	*	*	*		*		*	*	*	2 25. 4 25. 8 25. 25. 25. 25. 25. 25. 25. 25. 25. 25.
Thriving communities	*		*	*	*			*	**		*	*	ABA 16 CALLET
Trade & economic value	*	*	*			*	**	*	*				2 mm
Planet & Resources													
Water	**	*	**	**	**	*		**	**	**	*	**	6 statement 8 statement with the statement of the stateme
Landscapes	**	**	**	**	**	*	*	*	**	**	**	**	2 CO. 11 CO. 12 CO. 14 CO. 15
Climate	**	**	**	*	**	**	**	*	**	**	**	**	9 Marianese 13 Mari
Energy	*	*	**	*		*	**	*	*	*	*	*	7 mineral Control of C
Biosecurity	**	**	*	**	*				**	**	**	*	5 th
Less waste													
Food waste	*	**	*	*				**	**		*	*	12 soveri
Packaging		**	*				*	**	*			**	12 STORES
Farm waste	*	*	*					**	*		*	*	12 streets CO

THE GLOBAL GOALS















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In 2015 the United Nations' set out 17 Sustainable Development Goals (SDGs) to 'promote prosperity while protecting the planet'. Most targets are aimed to be achieved by 2030. The SDGs have been widely adopted by governments, industry and the private sector in reporting on sustainability objectives and achievements. Australia reports progress toward the SDGs 2030 targets in SDG Transforming Australia. The SDGs were considered in developing the horticulture goals.

SDGs relevant to each horticulture topic are identified.





Scope of the sustainability framework

This sustainability framework works across the whole horticultural sector to understand the sustainability topics most important to stakeholders, from growers and their suppliers and financiers through the supply chain to consumers and communities.

The scope is Australian-grown horticulture, covering all production steps and inputs up to the farm-gate, packhouse or production nursery. The supply chain beyond that is an important stakeholder.

The sustainability framework applies across the whole of Australian horticulture. The primary focus is on those horticultural industries which partner with Horticulture Innovation (fruits, vegetables, nuts and amenity horticulture). With such a diverse sector, some topics are more significant to some horticultural industries than others.

Sustainability measures would generally be reported in the aggregated commodity groupings: fruits, vegetables, nuts, and amenity horticulture. In some cases, sustainability measures may be based on production system (annual cropping, tree crops, plantation, protected cropping) or by production zone.

COMPONENTS

The sustainability framework is made up of:

- ▶ Four pillars
- ▶ Topics 17 topics across the pillars
- Sustainability goals for each topic
- ► Indicators for measuring progress against each goal
- ▶ Data sources for gathering information
- Case study possibilities for helping to share the stories of horticultural production, there's more to the story than data
- Targets are included where these are already existing, these may evolve over time.



Horticulture's sustainability goals

Nourish & Nurture

FOOD TO NOURISH PEOPLE

Healthier, nourishing diets through increased consumption of readily available, affordable Australiangrown fruits, vegetables and nuts

PLANTS TO NURTURE COMMUNITIES

Community health and wellbeing is improved through increased greenspace, plants and cut flowers in homes, cities and towns

SAFE, TRACEABLE, QUALITY

Australian-grown horticultural produce is trusted as safe and traceable

Reliable quality, authentic, Australian-grown horticultural produce is sought and valued by both international markets and Australian consumers

People & Enterprise

PRODUCTIVE, PROFITABLE GROWERS

Vibrant, productive, profitable enterprises

Maximise the quality and utilisation of all produce

Responsible management of pests, weeds, diseases
and agricultural inputs

SAFE & ETHICAL WORK

Provide ethical, fair and safe work conditions. Creating a culture of pro-actively meeting employment and duty of care obligations and standards of sustainable, ethical employment and procurement to prevent modern slavery Attract and retain motivated workers creating rewarding career paths and a sustainable workforce

Zero Harm

LEADERSHIP & GOVERNANCE

Australian horticulture's leadership structures and capacity build the vitality, sustainability and diversity of the horticulture sector

INNOVATION

World-leading research, technology and innovation improves practices and drives transformational change

THRIVING COMMUNITIES

Regional, peri-urban and urban communities value the contributions of horticulture

Recognition of horticulture in local government planning in key growing regions

TRADE & ECONOMIC VALUE

Become an economic powerhouse for local communities and the Australian economy

Sustainability goals can be used to inform investments, identify opportunities for collaboration, communicate with stakeholders and prioritise the important things to measure. The goals are broad enough to be relevant across the whole-of-horticulture whilst also detailed enough to allow individual industries to prioritise the goals most important to their production systems and environments. Individual industries or enterprises may use these as a starting point to develop a targeted, industry focussed approach.



WATER

Reliable, viable access to sustainable water resources Responsible and efficient use of allocated water to optimise production per unit of water

Objective measures guide more efficient water use Increased adoption of water recycling and reuse

LANDSCAPES

Best practice land management is used in horticultural production

Soil health and productive capacity is maintained or improved

Nutrient applications are matched to crop need

Movement of soil, nutrients and chemicals into the environment is minimised

Biodiversity is managed sustainably

Australian horticultural crops have effective pollination and protect pollinator species

CLIMATE

Australian horticulture understands and manages the risks of climate change and extreme weather variability and builds resilience to natural disasters

Increased use of horticultural plants and green space cools our cities and mitigates climate extremes

Horticultural plants capture carbon and production systems minimise greenhouse gas emissions

ENERGY

Energy is used efficiently, with an increased proportion from renewable sources

BIOSECURITY

Proactively manage biosecurity risks from pest and disease incursions into regions and Australia

Less waste

FOOD WASTE

Increase the proportion of produce that meets first grade quality and increase utilisation of lower grade produce Reduce food waste in the production system

PACKAGING

Packaging is minimised, recyclable, compostable or reusable

FARM WASTE

Reduce, reuse or recycle on-farm waste and input supply packaging

Where did these sustainability goals come from? Goals and targets from existing industry sources including each industry's Strategic Investment Plan², Hort Innovation strategy³, Horticulture for Tomorrow⁴, the Environmental Assessment of the Vegetable Industry, the United Nations Sustainable Development Goals and other national and global programs were used as a starting point for discussions with horticultural industries. The goals were iteratively reviewed and revised through discussions with peak industry bodies (staff and/or grower boards) and the project reference group.

² Strategic Investment Plans Hort Innovation www.horticulture.com.au

³ Hort Innovation Strategy 2019-2023 www.horticulture.com.au

⁴ Horticulture for Tomorrow. Guidelines for Environmental Assurance in Australian Horticulture. http://horticulturefortomorrow.com.au/





Indicators

TRACKING PROGRESS TOWARDS SUSTAINABLE HORTICULTURAL PRODUCTION

Indicators provide a means to measure how horticulture is tracking against each goal and topic. Monitoring will be more achievable and cost effective where the data can be gathered from existing sources (such as Australian Bureau of Statistics (ABS) and industry projects and programs). The indicators that follow are a best fit between the goals and the available data sets.

Whole-of-horticulture targets are not identified in this sustainability framework. Each industry may wish to develop targets specific to their production systems. Targets may be relevant for industries with similar cropping systems (e.g. sub-tropical tree fruits). A first step may be to measure where the industry is at currently – for most indicators this can be readily done with available data.

Nourish & Nurture

Australian-grown horticultural produce nourishes people with nutritious fruits, vegetables and nuts and improves our cities, landscapes, health and wellbeing with greenspace and plants from turf and nursery sector.

Each year, Australia's horticultural producers grow over 6.5 million tonnes of fruits, vegetables, nuts and amenity horticultural products for communities around Australia and the globe. Safety, traceability and quality of these products is a priority. Commitment to research and quality has improved the nutritional value of some Australian-grown produce.

The Nourish & Nurture pillar has three topics with four goals.

FOOD TO NOURISH PEOPLE

Goal N. 1 Healthier, nourishing diets through increased consumption of readily available, affordable Australian-grown fruits, vegetables and nuts

PLANTS TO NURTURE COMMUNITIES

Goal N. 2 Community health and wellbeing is improved through increased greenspace, plants and cut flowers in homes, cities and towns

SAFE, TRACEABLE, QUALITY

Goal N. 3 Australian-grown horticultural produce is trusted as safe and traceable

Goal N. 4 Reliable quality, authentic, Australian-grown horticultural produce is sought and valued by both international markets and Australian consumers





Nourish & Nurture



Food to nourish people

Goal N.1

Healthier, nourishing diets through increased consumption of readily available, affordable Australian-grown fruits, vegetables and nuts

INDICATORS

N.1.1 % Australian adults meeting the recommended daily intake of fruits

N.1.2 % Australian adults meeting the recommended daily intake of vegetables

N.1.3 % Australian adults meeting the recommended daily intake of nuts

N.1.4 Nutritional value of horticultural produce

N.1.5 Global Food Security Index – measure of affordability, availability, and quality adjusted for natural resources and resilience

SUSTAINABLE GOALS



SDG 2.1 By 2030, end hunger and ensure access by all people, in particular the poor and people in

vulnerable situations, including infants, to safe, nutritious and sufficient food all year round.

SDG 2.2 By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons.



Plants to nurture communities

Goal N.2

Community health and wellbeing is improved by increased greenspace, plants and cut flowers in homes, cities and towns

INDICATORS

N.2.1 Proportion of Australian urban environments that is greenspace

N.2.2 Measured benefits of plants in homes, cities and towns, including benefits to mental health

N.2.3 Consumer attitudes to the benefits of greenlife

SUSTAINABLE GALS



SDG 11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in

particular for women and children, older persons and persons with disabilities.



SDG 13.3 Improve education, awareness-raising and human and institutional capacity on

climate change mitigation, adaptation, impact reduction and early warning.



Nourish & Nurture



Safe, traceable, quality

Goal N.3

Australian-grown horticultural produce is trusted as safe and traceable

INDICATORS

- **N.3.1** Number of sites certified to a Global Food Safety Initiative recognised scheme
- N.3.2 Number of product recalls due to food contamination per year
- **N.3.3** Assessed effectiveness of product traceability systems and industry / consumers / marketer & retailer satisfaction with these systems
- N.3.4 % Consumers who value Australian horticultural produce as safe

Goal N.4

Reliable quality, authentic, Australian-grown horticultural produce is sought and valued by both international markets and Australian consumers

INDICATORS

- **N.4.1** Consumer perceptions of quality
- N.4.2 Industry led programs for quality standards

SUSTAINABLE GALS



SDG 2.1 By 2030, end hunger and ensure access by all people, in particular the poor and people in

vulnerable situations, including infants, to safe, nutritious and sufficient food all year round.

People are core to horticultural production. Over 70,000 people are employed by nearly 12,000 farms and nurseries to generate \$13.2 billion worth of produce each year. Alongside the growers who lead horticultural enterprises, people are employed in roles ranging from seasonal harvest and pruning labour through to permanent and skilled positions in farming, agronomy, propagation, packing, marketing, agri-tourism, management, logistics, freight and other careers.

With Australia's high labour costs, innovation is critical to ensure producers are competitive on the world stage and provide affordable produce for Australians whilst also providing safe and rewarding work. Ethical and fair employment is essential to protect both workers and producers.

Horticultural enterprises are located in communities around Australia in urban, peri-urban, regional and remote areas. They are an important part of the landscape and provide major sources of employment in some communities. Horticultural production generates substantial economic value for Australia through domestic and export markets.

The People & Enterprise pillar has six topics and eleven goals.

PRODUCTIVE, PROFITABLE GROWERS

- Goal P. 1 Vibrant, productive, profitable enterprises
- Goal P. 2 Maximise the quality and utilisation of all produce
- **Goal P. 3** Responsible management of pests, weeds, diseases and agricultural inputs

SAFE & ETHICAL WORK

- **Goal P. 4** Provide ethical, fair and safe work conditions. Creating a culture of pro-actively meeting employment and duty of care obligations and standards of sustainable, ethical employment and procurement that mitigate risks of modern slavery
- **Goal P. 5** Attract and retain motivated workers creating rewarding career paths and a sustainable workforce
- Goal P. 6 Zero Harm

LEADERSHIP & GOVERNANCE

Goal P. 7 Australian horticulture's leadership structures and capacity build the vitality, sustainability and diversity of the horticulture sector

INNOVATION

Goal P. 8 World-leading research, technology and innovation improves practices and drives transformational change

THRIVING COMMUNITIES

- **Goal P. 9** Regional, peri-urban and urban communities value the contributions of horticulture
- Goal P. 10 Recognition of horticulture in local government planning in key growing regions

TRADE & ECONOMIC VALUE

Goal P. 11 Become an economic powerhouse for local communities and the Australian economy









Productive, profitable growers

Goal P.1

Vibrant, productive, profitable enterprises

INDICATORS

P.1.1 Land use productivity (Gross Value of Production/ha)

P.1.2 Volume of production

P.1.3 Costs of production

P.1.4 Labour productivity (Gross Value of Production/Full-time Equivalent)

P.1.5 Return on capital

P.1.6 Change in farmgate price

Maximise the quality and utilisation of all produce

INDICATORS

P.2.1 Marketable yield (packout) as % of harvested yield

Goal P.3

Responsible management of pests, weeds, diseases and agricultural inputs

INDICATORS

P.3.1 Industry capability to effectively manage pests, weeds and diseases

Capability, understanding and adoption of integrated pest, disease and integrated weed management (IPDM and IWM) and resistance management strategies

SUSTAINABLE GOALS



SDG 2.3 By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular

women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment.

SDG2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality.

SDG 2.5 By 2020 maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally



SDG 8.2 Achieve higher levels of economic productivity through diversification,

technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors

SDG 8.3 Promote development-oriented policies that support productive activities. decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services



SDG 12.4 By

2020, achieve the environmentally sound management of chemicals

and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.





Safe & ethical work

Goal P.4

Provide ethical, fair and safe work conditions. Creating a culture of pro-actively meeting employment and duty of care obligations and standards of sustainable, ethical employment and procurement that mitigate risks of modern slavery

INDICATORS

P.4.1 Number of people employed in horticulture

P.4.2 Evidence of commitment to fair and ethical work conditions, such as the number of workers employed by businesses using programs such as Fair Farms

Goal P.5

Attract and retain motivated workers creating rewarding career paths and a sustainable workforce

INDICATORS

P.5.1 % producers reporting their business was impacted by difficulty in sourcing skilled workers

P.5.2 Permanent staff retention rates

P.5.3 Proportion of seasonal workers who continue in horticulture

P.5.4 Career pathways available

P.5.5 Number of apprentices

P.5.6 Education level of horticulture employees

Goal P.6

Zero harm

INDICATORS

P.6.1 Serious injury claims per million hours worked

P.6.2 Number of deaths per year

P.6.3 Evidence that WHS procedures and training programs have reduced safety incidents

SUSTAINABLE GOALS



SDG 8.7 Take immediate and effective measures to eradicate forced labour, end modern slavery

and human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms.

SDG 8.8 Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment.





Leadership & governance

Goal P7

Australian horticulture's leadership structures and capacity build the vitality, sustainability and diversity of the horticulture sector

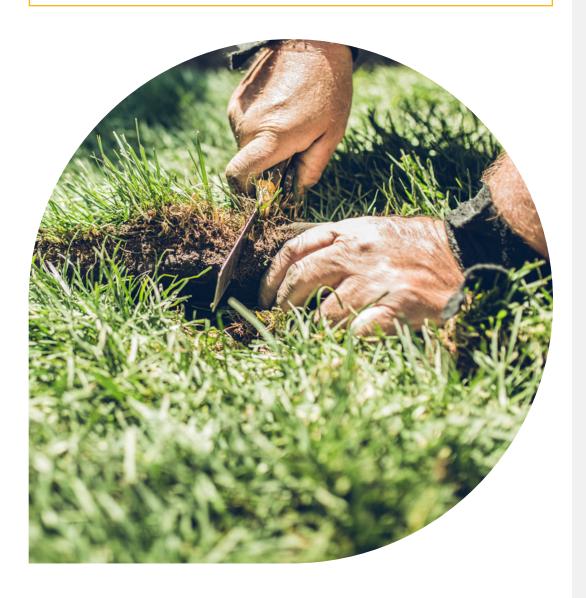
INDICATORS

P.7.1 Perceived effectiveness of horticulture sector leadership structures and capacity

P.7.2 Participation by growers and industry in leadership training opportunities

P.7.3 Diversity of participation in industry, leadership roles and training opportunities

P.7.4 % horticultural businesses with written business plan



SUSTAINABLE GOALS



SDG 5.5 Ensure women's full and effective participation and equal opportunities for leadership

at all levels of decision making in political, economic and public life.



SDG 16.6 Develop effective, accountable and transparent institutions at all levels.

SDG 16.7 Ensure responsive, inclusive, participatory and representative decision-making at all levels.





Goal P.8

World-leading research, technology and innovation improves practices and drives transformational change

INDICATORS

- **P.8.1** % producers adopting improved management practices and technologies (or adoption of research outcomes)
- P.8.2 Industry investment in research
- P.8.3 Economic impact of R&D investment
- P.8.4 Industry capacity, skills, culture, collaborations and partnerships driving innovation

SUSTAINABLE GOALS



SDG 2.3 By 2030, double the agricultural productivity and incomes of small-scale food

producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment.

SDG 2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality.



SDG 4.4 By 2030, substantially increase the number of youth and adults who have relevant

skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship.



SDG 8.2 Achieve higher levels of economic productivity through diversification,

technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors.



SDG 9.5 Enhance scientific research, upgrade the technological capabilities of industrial sectors in

all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending.





Thriving communities

Regional, peri-urban and urban communities value the contributions of horticulture

INDICATORS

P.9.1 Proportion of employment in local communities that is related to horticultural production

P.9.2 Regional impact: direct and indirect (flow on) contribution to gross regional product

P.9.3 Regional impact: direct and indirect (flow on) contribution to employment

The extent of horticulture producers and employees' involvement in local community activities

Goal P.10

Recognition of horticulture in local government planning in key growing regions

INDICATORS

P.10.1 Effectiveness of planning mechanisms to reduce conflict between horticultural production and residential and peri-urban land uses

P.10.2 Proportion of industry gross value of production (GVP) grown in significant urban areas (SUAs)

SUSTAINABLE GOALS



SDG 11.A Support positive economic, social and environmental links between urban, peri-urban

and rural areas by strengthening national and regional development planning.



SDG 16.7 Ensure responsive, inclusive. participatory and representative decisionmaking at all levels.





Trade & economic value

Goal P11

Become an economic powerhouse for local communities and the Australian economy

INDICATORS

P.11.1 Gross value of production

P.11.2 Value of horticultural exports

P.11.3 Industry sentiment

P.11.4 Resilience to and preparedness for trade risk exposure and market volatility

P.11.5 Diversification of income streams



SUSTAINABLE GOALS



SDG 2.B Correct and prevent trade restrictions and distortions in world agricultural markets,

including through the parallel elimination of all forms of agricultural export subsidies and all export measures with equivalent effect, in accordance with the mandate of the Doha Development Round

SDG 2.C Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility.



SDG 8.1 Sustain per capita economic growth in accordance with national circumstances and, in

particular, at least 7 per cent gross domestic product growth per annum in the least developed countries.

SDG 8.4 Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programmes on sustainable consumption and production, with developed countries taking the lead.

SDG 8.9 By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products.



Horticultural production is intrinsically linked with its natural environment and reliant on resources. Healthy soils and reliable water supplies are vital for production. Horticulture is generally intensive, generating a high value of production from a relatively small land area, nestled amongst a diverse range of natural and built environments.

Reducing the footprint on the planet is important to the sector. Efficient use of resources and care to prevent run-off or leaching of nutrients, chemicals and soils is needed to protect downstream environments. Horticultural production systems have scope to help capture carbon. As climatic extremes and natural disasters become more common it is essential that producers and the supply chain can adapt and prepare for these extremes.

Energy is essential for coolrooms, tractors, pumps and packing facilities. Growers are seeking energy efficient systems and there is growing interest in renewable energy to offset this usage.

Protecting crops from pest and disease incursions is vital. Many crops are reliant on bees and other insects for pollination.

The Planet & Resources pillar has five topics and fifteen goals.

WATER

- **Goal R. 1** Reliable, viable access to sustainable water resources
- Goal R. 2 Responsible and efficient use of allocated water to optimise production per unit of water
- Goal R. 3 Objective measures guide more efficient water use
- Goal R. 4 Increased adoption of water recycling and reuse

LANDSCAPES

- **Goal R. 5** Best practice land management is used in horticultural production
- Goal R. 6 Soil health and productive capacity is maintained or improved
- Goal R. 7 Nutrient applications are matched to crop need
- Goal R. 8 Movement of soil, nutrients and chemicals into the environment is minimised
- **Goal R. 9** Biodiversity is managed sustainably
- Goal R. 10 Australian horticultural crops have effective pollination and protect pollinator species

CLIMATE

- **Goal R. 11** Australian horticulture understands and manages the risks of climate change and extreme weather variability and builds resilience to natural disasters
- **Goal R. 12** Increased use of horticultural plants and green space cools our cities and mitigates climate extremes
- Goal R. 13 Horticultural plants capture carbon; production systems minimise greenhouse gas emissions

ENERGY

Goal R. 14 Energy is used efficiently, with an increased proportion from renewable sources

BIOSECURITY

Goal R. 15 Proactively manage biosecurity risks from pest and disease incursions into regions and Australia





Goal R.1

Reliable, viable access to sustainable water resources

INDICATORS

R.1.1 % producers with a water security risk strategy

R.1.2 % farms with adequate water for cropped area

Goal R.2

Responsible and efficient use of allocated water to optimise production per unit of water ^

INDICATORS

R.2.1 Irrigation water use efficiency ML/ha

R.2.2 Water use efficiency (Yield /ML)

R.2.3 Water use productivity (GVP \$/ML)

Goal R.3

Objective measures guide more efficient water use

INDICATORS

R.3.1 % growers using soil moisture monitoring

R.3.2 % growers scheduling irrigation to measured deficits

Goal R.4

Increased adoption of water recycling and reuse

INDICATORS

R.4.1 Safe and efficient use of water recycling and reuse practices in production

R.4.2 Safe and efficient use of water recycling and reuse practices in packing sheds

^ Water supply for extractive use (including irrigation) is managed by governments through regulated allocations and water planning. The goals is to make best use of allocated water, assuming impacts of extraction are managed by the allocation process.

SUSTAINABLE GOALS



SDG 6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure

sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity.

SDG 6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate.



SDG 8.4 Improve progressively, through 2030, global resource efficiency in consumption

and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programmes on sustainable consumption and production, with developed countries taking the lead.

SDG 8.9 By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products.





Landscapes

Goal R.5

Best practice land management is used in horticultural production

INDICATORS

R.5.1 Participation in best practice programs (number of enterprises and hectares of production involved)

Goal R.6

Soil health and productive capacity is maintained or improved

INDICATORS

- R.6.1 % horticultural businesses undertaking soil, leaf or fruitlet tests by frequency
- **R.6.2** % farms with organic carbon in topsoil steady or improving
- **R.6.3** Proportion of businesses using management practices to maintain ground cover for horticultural plantings
- **R.6.4** % farms with soil maps and/or descriptions

Goal R.7

Nutrient applications are matched to crop need

INDICATORS

- **R.7.1** % producers using an informed strategy to match nutrient use to crop needs
- **R.7.2** Nutrient use efficiency
- **R.7.3** Use of best practices to manage manures and composts

Goal R.8

Movement of soil, nutrients and chemicals into the environment are minimised

INDICATORS

- **R.8.1** Container production uses growing medium that minimises nutrient loss
- **R.8.2** Use of erosion management strategies on drains and drainage areas in high risk run-off areas e.g. minimal slope, sealed or grassed or vegetated
- **R.8.3** Use of systems to filter run-off water from container-grown production systems and packing sheds

SUSTAINABLE GOALS



SDG 2.4 By 2030, ensure sustainable food production systems and implement resilient

agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality.



SDG 6.3 By 2030, improve water quality by reducing pollution, eliminating dumping

and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.

SDG 6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aguifers and lakes.



SDG 11.4 Strengthen efforts to protect and safeguard the world's cultural and natural heritage.



SDG 12.2 By 2030, achieve the sustainable management and efficient use of natural resources.

SDG 12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.

SDG 12.6 Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle.





Landscapes (continued)

Goal R.9

Biodiversity is managed sustainably

INDICATORS

R.9.1 % businesses with land set aside for conservation / protection

R.9.2 Involvement in activities to encourage biodiversity

R.9.3 % producers actively managing feral animals and invasive weeds

R.9.4 Proportion of nursery plants sold that are Australian native or can provide biodiversity value

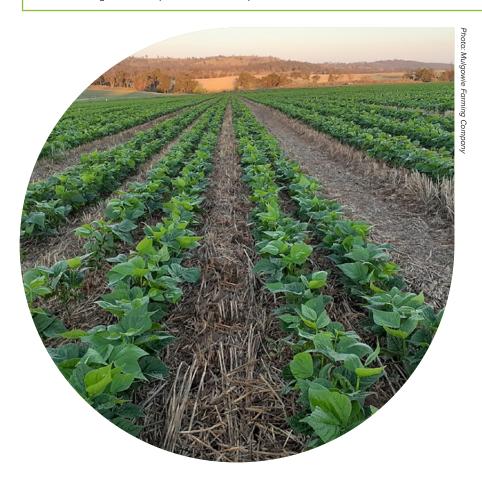
Goal R.10

Australian horticultural crops have effective pollination and protect pollinator species

INDICATORS

R.10.1 Pollination services match demand

R.10.2 Strategies used to protect and attract pollinators



SUSTAINABLE GOALS



SDG 14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from

land-based activities, including marine debris and nutrient pollution.



SDG 15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the

loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species.

SDG 15.8 By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species.

SDG 15.A Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems.





Goal R.11

Australian horticulture understands and manages the risks of climate change and extreme weather variability and builds resilience to natural disasters

INDICATORS

R.11.1 % producers with a climate risk assessment and management strategy

R.11.2 Availability of financial and insurance products that help build resilience to natural disasters and extreme weather

Goal R.12

Increased use of horticultural plants and green space cools our cities and mitigates climate extremes

INDICATORS

 $\textbf{R.12.1} \hspace{0.3cm} \% \hspace{0.1cm} \text{reduction in urban heat effect through greenlife}$

R.12.2 Contribution of appropriate greenlife to mitigating bushfire hazard in urban environments

Goal R.13

Horticultural plants capture carbon; production systems minimise greenhouse gas emissions

INDICATORS

R.13.1 Carbon sequestration of horticultural plantings (CO2 e)

R.13.2 Agricultural soils—Direct soil emissions—Inorganic fertilisers

R.13.3 Greenhouse gas emissions: Agricultural soils – Indirect soil emissions including atmospheric deposition, fertiliser and nitrogen leaching and run-off fertiliser

R.13.4 Greenhouse gas emissions from land use, land use change and forestry, cropland, perennial woody crops

R.13.5 Life cycle impact assessment

SUSTAINABLE GOALS



SDG 9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable,

with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities.



SDG 13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural

disasters in all countries

SDG 13.2 Integrate climate change measures into national policies, strategies and planning

SDG 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.





Goal R.14

Energy is used efficiently, with an increased proportion from renewable sources

INDICATORS

R.14.1 Energy use GJ/unit production

R.14.2 % Producers who monitor and review electricity and fuel use

 $\bf R.14.3~~\%$ farms using practices to improve efficiency

R.14.4 Share of energy from renewable sources



SUSTAINABLE GOALS



SDG 7.1 By 2030, ensure universal access to affordable, reliable and modern energy services

SDG 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix

SDG 7.3 By 2030, double the global rate of improvement in energy efficiency





Goal R.15

Proactively manage biosecurity risks from pest and disease incursions into regions and Australia

INDICATORS

R.15.1 % producers having a biosecurity management plan

R.15.2 Industry capacity to respond to a biosecurity incursion

R.15.3 Biosecurity protocols, technology and strategies for market access

SUSTAINABLE GOALS



SDG 15.8 By 2020, introduce measures to prevent the introduction and significantly reduce the

impact of invasive alien species on land and water ecosystems and control or eradicate the priority species



Less waste

This pillar is about reducing all forms of waste in horticultural production.

Food waste in the production system occurs primarily when produce doesn't meet quality standards. Improving quality of production is the first priority. Developing markets and value-add products for secondary produce is the next alternative to reduce waste.

Much work is underway in the packaging sector to develop compostable or recyclable packaging options for horticultural produce (punnets, salad bags, nursery pots, etc). Reduce net waste is a balance where packaging can help to extend shelf life, reducing food waste or where trimmed and packed vegetables such as sweet corn can reduce the freight footprint compared with whole produce.

Major wastes on farm are the packaging of input supplies, plastic bunch bags (in bananas) and end-of-life drip irrigation tape. Organic 'waste' on farm is generally turned back into soils or composts to benefit soil health. There are some challenges such as pineapple tops which are too acid to incorporate into soils. This pillar has three topics and four goals.

FOOD WASTE

Goal W. 1 Increase the proportion of produce that meets first grade quality and increase utilisation of lower grade produce

Goal W. 2 Reduce food waste in the production system

PACKAGING

Goal W. 3 Packaging is minimised, recyclable, compostable or reusable

FARM WASTE

Goal W. 4 Reduce, reuse or recycle on-farm waste and input supply packaging





Less waste



Goal W.1

Increase the proportion of produce that meets first grade quality and increase utilisation of lower grade produce

INDICATORS

W.1.1 % produce meeting first grade quality standards

W.1.2 Volume of potential food waste saved through secondary products

W.1.3 New food science solutions to utilise lower grade produce

Goal W.2

Reduce food waste in the production system

INDICATORS

W.2.1 Volume of on-farm food waste (tonnes edible produce not entering the supply chain)

SUSTAINABLE GOALS



SDG 12.3 By 2030, halve per capita global food waste at the retail and consumer levels and

reduce food losses along production and supply chains, including post-harvest losses.



Less waste



Goal W.3

Packaging is minimised, recyclable, compostable or reusable

INDICATORS

W.3.1 % of horticultural packaging that is recyclable, compostable or reusable

W.3.2 Days of shelf-life extension provided by packaging

SUSTAINABLE GALS



SDG 12.3 By 2030, halve per capita global food waste at the retail and consumer levels and reduce

food losses along production and supply chains, including post-harvest losses.

SDG 12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.



Goal W.4

Reduce, reuse or recycle on-farm waste and input supply packaging

INDICATORS

 $\textbf{W.4.1} \hspace{0.3in} \% \hspace{0.1in} \textbf{Producers with a waste management plan}$

W.4.2 Volume organic farm waste to landfill

W.4.3 Volume organic farm waste diverted to composting for reuse

W.4.4 Volume inorganic farm waste

W.4.5 Regional distribution of reuse and recycling facilities for plastic waste from farms (drip tape, films, bunch bags, input supplies etc)

W.4.6 Proportion of input supply packaging that is reused, recycled or composted

SUSTAINABLE GOALS DEVELOPMENT



SDG 12.5 By 2030, substantially reduce waste generation through prevention, reduction,

recycling and reuse.



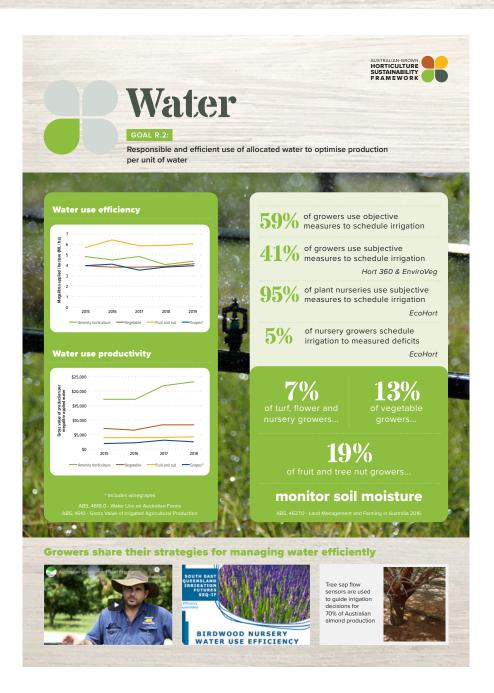
GATHERING DATA AND CASE STUDIES

Horticulture's sustainability story

To be transparent and to connect with stakeholders, horticulture's sustainability stories are proposed to combine both data and case studies. Data can be gathered from a range of existing sources. The indicators have been tailored to be a balance between the goals and the available data to provide a structured, repeatable reporting process that can be used over time.

Available data sets have been mapped and gathered for most indicators. Data can be drawn from the ABS, levy-funded investments and industry programs. Indicators relating to practices will sometimes draw on ABS data. In other cases they relate to practices in the Hort360, EnviroVeg and EcoHort programs.

To illustrate the diverse and complex stories of horticultural production systems and industries, case studies will be used. Case studies can illustrate sustainable practices used, challenges faced and innovations for managing a specific topic or they may be about approaches to sustainability management as a whole. Detailed tables mapping the proposed and existing case studies and data sets to each indicator have been developed (available on request). Illustrated here is an example for the water topic that draws together ABS, Hort360, EnviroVeg and EcoHort data and case studies.







Next steps for consideration

The sustainability framework has been prepared in consultation with industry and stakeholders through a Hort Innovation funded project.

The sustainability framework provides a logical process to gather together the many pieces of existing information to share horticulture's story. This will help industry bodies to understand where the sector is out now – where there are strengths and which areas to prioritise for future investment or policy work. Much of the existing data has already been gathered in the process of setting indicators. New or redeveloped case studies would be beneficial.

Information gathering may be done for whole-of-horticulture, by individual industries or clusters of industries.

Many of the topics identified are not unique to horticultural production and there are many opportunities to address these through collaboration across the supply chain and/or improved local infrastructure (e.g., recycling facilities). Industry leadership in application of the sustainability framework may help to broker these partnerships.



Global Reporting Initiative alignment

The Global Reporting Initiative (GRI)'s standards are designed to be used by organisations to report about their impacts on the economy, the environment, and society. GRI's globally recognised framework for sustainability reporting guided the materiality assessment for Australian-grown horticulture. Alignment of the Australian-grown Horticulture Sustainability goals with the Global Reporting Initiative Topic-specific Standards are mapped here.

GRI standards	Horticulture sustainability goals
GRI 200: Economic	People & Enterprise
GRI 201: Economic Performance	 P.1 Vibrant, productive, profitable enterprises P.8 World-leading research, technology and innovation improves practices and drives transformational change
GRI 202: Market Presence	P.11 Become an economic powerhouse for local communities and the Australian economy.
GRI 203: Indirect Economic Impacts	P.9 Regional, peri-urban and urban communities value the contributions of horticulture
GRI 204: Procurement Practices	
GRI 205: Anti-corruption	P.7 Australian horticulture's leadership structures and capacity build the vitality, sustainability and diversity of the horticulture sector
GRI 206: Anti-competitive Behaviour	
GRI 300: Environmental	Planet & Resources Less waste
GRI 301: Materials	P.2 Maximise the quality and utilisation of all produceP.3 Responsible management of pests, weeds, diseases and agricultural inputs
GRI 302: Energy	R.14 Energy is used efficiently, with an increased proportion from renewable sources
GRI 303: Water and Effluents	 R.1 Reliable, viable access to sustainable water resources R.2 Responsible and efficient use of allocated water to optimise production per unit of water. R.3 Objective measures guide more efficient water use. R.4 Increased adoption of water recycling and reuse R.7 Nutrient applications are matched to crop need R.8 Movement of soil, nutrients and chemicals into the environment are minimised
GRI 304: Biodiversity	 R.6 Soil health and productive capacity is maintained or improved R.9 Biodiversity is managed sustainably R.10 Australian horticultural crops have effective pollination and protect pollinator species R.15 Proactively manage biosecurity risks from pest and disease incursions into regions and Australia
GRI 305: Emissions	 R.11 Australian horticulture understands and manages the risks of climate change and extreme weather variability and builds resilience to natural disasters R.12 Increased use of horticultural plants and green space cools our cities and mitigates climate extremes R.13 Horticultural plants capture carbon; production systems minimise greenhouse gas emissions
GRI 306: Effluents and Waste	 W.1 Increase the proportion of produce that meets first grade quality and increase utilisation of lower grade produce W.2 Reduce food waste in the production system W.3 Packaging is minimised, recyclable, compostable or reusable W.4 Reduce, reuse or recycle on-farm waste and input supply packaging
GRI 307: Environmental Compliance	R.5 Best practice land management is used in horticultural production [Additionally, compliance with Australian regulations]
GRI 308: Supplier Environmental Assessment	



GRI 400: Social	Nour	rish & Nurture	People & Enterprise				
GRI 401: Employment	P.4	Provide ethical, fair and safe work conditions. Create a culture of pro-actively meeting employment and duty of care obligations and standards of sustainable, ethical employment that mitigate risks of modern slavery.					
GRI 402: Labor/Management Relations	P.5	Attract and retain motivated workers creating rewarding career paths and a sustainable workforce.					
GRI 403: Occupational Health and Safety	P.6	Zero Harm					
GRI 404: Training and Education	P.5	Attract and retain motivated workers creating rewarding career paths and a sustainable workforce.					
GRI 405: Diversity and Equal Opportunity	P.7	Australian horticulture's leadership structures and capacity build the vitality, sustainability and diversity of the horticulture sector					
GRI 406: Non-discrimination	P.4	Provide ethical, fair and safe work conditions. Creating a culture of pro-actively meeting employment and duty of care obligations and standards of sustainable, ethical employment that mitigate risks of modern slavery.					
	P.7	Australian horticulture's leadership structures and capacity build the vitality, sustainability a diversity of the horticulture sector					
GRI 407: Freedom of Association and Collective Bargaining	P.4	Provide ethical, fair and safe work conditions. Creating a culture of pro-actively meeting employment and duty of care obligations and standards of sustainable, ethical employment that mitigate risks of modern slavery.					
GRI 408: Child Labor	P.4	Provide ethical, fair and safe work conditions. Creating a culture of pro-actively meeting employment and duty of care obligations and standards of sustainable, ethical employment that mitigate risks of modern slavery.					
GRI 409: Forced or Compulsory Labor	P.4	Provide ethical, fair and safe work conditions. Creating a culture of pro-actively meeting employment and duty of care obligations and standards of sustainable, ethical employment that mitigate risks of modern slavery.					
GRI 410: Security Practices							
GRI 411: Rights of Indigenous Peoples							
GRI 412: Human Rights Assessment							
GRI 413: Local Communities	P.9 P.10	Regional, peri-urban and urban communities value the contributions of horticulture Recognition of horticulture in local government planning in key growing regions					
GRI 414: Supplier Social Assessment		3	, 3 ,3 3 3				
GRI 415: Public Policy							
GRI 416: Customer Health and Safety	416: Customer Health and N.1 Healthier, nourishing diets through increased consumption of readily available, a						
	N.2	, ,	proved by increased greenspace, plants and cut flower				
	N.3	Australian-grown horticultural produce	is trusted as safe and traceable				
GRI 417: Marketing and Labelling	N.4	Reliable quality, authentic, Australian-grown horticultural produce is sought and valued by both international markets and Australian consumers					
GRI 418: Customer Privacy							

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