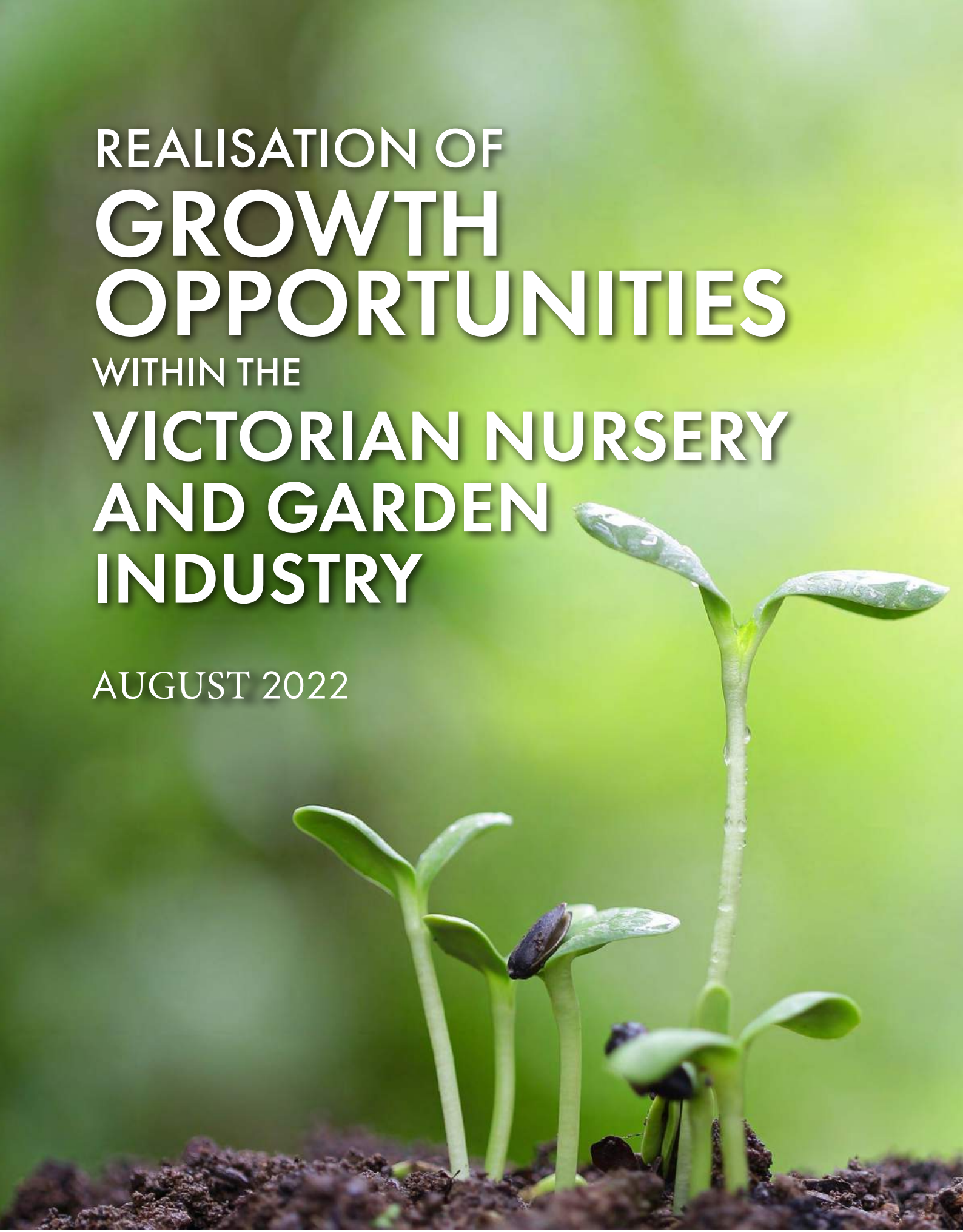
REALISATION OF GROWTH OPPORTUNITIES WITHIN THE VICTORIAN NURSERY AND GARDEN INDUSTRY

AUGUST 2022



Nursery & Garden Industry Victoria

RMCG

AGRICULTURE VICTORIA

This report was prepared by RM Consulting Group, in collaboration with Nursery and Garden Industry Victoria, with funding from the Agriculture Victoria Food to Market Program

August 2022

RM Consulting Group
Level 1 East, 1100-1102 Toorak Road
Camberwell VIC 3124

(03) 9882 2670

www.rmcg.com.au

Nursery & Garden Industry Victoria

PO Box 2280
Wattletree Road LPO
East Malvern VIC 3145

(03) 9576 0599

www.ngiv.com.au

AGRICULTURE VICTORIA

https://agriculture.vic.gov.au

Cover photo: istock.com/paladin13

CONTENTS

Photo: Clinton Muller

EXECUTIVE SUMMARY

The Victorian nursery and garden industry is a complex, yet important agricultural industry to the Victorian economy. The industry is more than just 'growing plants', and is inclusive of plant, turf, cut flowers and medicinal cannabis producers, as well as the allied businesses that supply inputs into the production supply chain, and the markets selling the products to wholesale and retail customers.

This report, funded through the Agriculture Victoria Food to Market Program, has been prepared as a result of a study to support the industry to understand its contribution to the Victorian economy and employment, as well as realise the opportunities for growth within the sector and its allied trades, including future workforce planning and addressing skill gaps.

The study estimates the output of the Victorian nursery and garden industry, to be **$2.5 billion** with a total employment of 24,100 in 2020/21.

The calculation of the output is based on the value of endpoint sales only, meaning that it has been calculated to remove double counting (for instance a plant that is sold multiple times within the industry is only valued once). This methodology whilst robust,

Photo: NGIV

provides a conservative estimate of industry value given that business to business trading is not included and is a significant feature of the industry.

While the study provides a snapshot in time for the value of industry, we also found that producer and industry stakeholder sentiment remains positive, with a strong outlook for future growth. Of the production nursery producers surveyed, close to 75% indicated their intention to expand their operation in the near future, with no respondents suggesting a contraction of current business activities.

While the outlook for the industry is strong, forward planning is fundamental to sustain growth in the sector. Through the study, the biggest challenge identified by industry participants was skilled labour. Whilst opportunities for skill development include traditional agronomy and plant husbandry, emerging skill needs also include technology, business management and enterprise skills to meet the increasing diversity of career opportunities in the sector across the entire supply chain.

Key recommendations emerging from the study to support the continued growth of the Victorian nursery and garden industry include:

- Promotion of **green infrastructure** and **re-greening initiatives** to facilitate action on climate change and improved liveability of built environments
- Strategic collaboration with targeted local government, water and other utilities to support **sector expansion and growth**
- Investment into appropriate and industry relevant technologies, infrastructure and teaching staff within **education and training** facilities
- Targeted investment and focus on addressing **emerging priority skill gaps** in the industry workforce
- Promotion, attraction and retention strategies for growth of a **skilled workforce**
- Facilitation of **geographic industry growth** opportunities, including planning instruments, recycled water and energy infrastructure, in the Mornington Peninsula, West Gippsland and Geelong and the Surf Coast regions
- Further exploration and investment into unique interstate and international export opportunities through an **export strategy** addressing barriers to market access, product development and intellectual property
- Pursuit of scoping for a **Horticulture Centre of Excellence** to facilitate education and training, partnerships and collaboration, research and development and a greenlife market for the Victorian industry.

1 INTRODUCTION

Supply chain businesses within the Victorian nursery and garden industry sector aim to ensure that the next generation of horticulturists meet the needs of a resilient, sustainable and skilled workforce. The industry has sought to realise the opportunities for growth within the sector and its allied trades, which is performing strongly, with projections in the medium and longer term indicating continued advancement.

Coordinated by the peak state industry association, Nursery and Garden Industry Victoria (NGIV), with funding from Agriculture Victoria, this report outlines a comprehensive review of the Victorian nursery and garden sector to identify skills gaps, employee shortages, improve future workforce planning, encourage business investment and provide direction as to how the sector can better market horticulture as a career of choice.

The first stage of this process has been to establish robust information that describes the current and projected performance of nursery and garden supply chain businesses across Victoria, as outlined in **Sections 3** and **4** of this report. Secondly, the gaps in workforce, technology, and business strategy necessary to support the industry in realising this potential growth have been identified and assessed as outlined in **Section 5**.

Photo: istock.com/Nattawat-Nat

Photo: istock.com/Bastetamn

The project has been supported through the **Agriculture Victoria Food To Market Program**. This program aims to support jobs, deliver productivity improvements and capitalise on new opportunities across the agri-food supply chain.

As a result of this project, the Nursery and Garden Industry has:

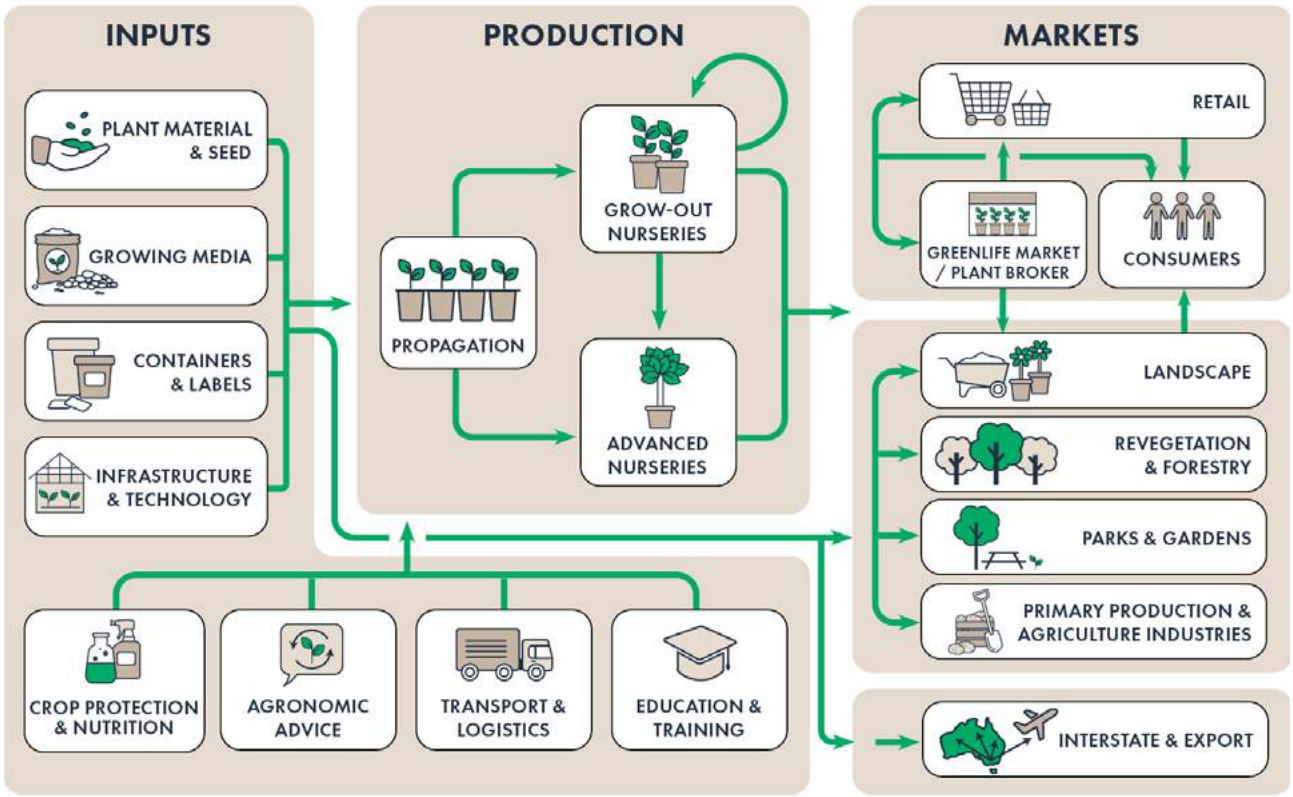
- A clear understanding of the contribution their industry makes to the Victorian economy
- Robust information on the current and projected performance of related businesses across Victoria
- Identification of workforce gaps and current workforce and future development needs
- Recommendations about the technology, and business strategy necessary to support the industry in realising future growth
- Opportunities explored for additional domestic and international market growth for the industry.

1.1 PROJECT SCOPE

The scope of the project includes all Victorian nursery and garden production businesses (including turf, cut flowers and medicinal cannabis), businesses upstream of production (such as plant material, media and containers) and markets. A map of the industry supply chain is provided in **Figure 1.1**, inclusive of:

- Allied suppliers that provide the inputs into the production supply chain and support retailers
- Nursery and garden production for amenity, including wholesale and retail components
- Nursery and garden production for production horticulture, which is wholesale only.

FIGURE 1.1 VICTORIAN NURSERY AND GARDEN INDUSTRY SUPPLY CHAIN



1

Specific examples and explanations for the various components of the Victorian nursery and garden industry supply chain are outlined as follows:

INPUTS

Plant material & seed – includes all seeds, bulbs and vegetative materials to propagate plants, for example tissue culture or cuttings, which may be sourced locally or imported.

Growing media – material produced and used including any substrate for the growing of plants but not limited to pine bark compost, coir and peat.

Containers & labels –pots, bags and trays used for the growing of plants and labels attached to plants ready for market.

Infrastructure & technology – industry services for equipment (such as potting machines, benches, carts) and infrastructure (such as protective cropping structures, irrigation systems) that facilitate the production of plants.

Crop protection & nutrition – organic and inorganic chemistry to support plant growth.

Agronomic advice – including agriculture extension and services to support growers with plant production.

Transport & logistics – specialised vehicles and storage for transport of plants

Education & training – generally an educational institution that provides formal and informal specialist skill development for the nursery and garden industry workforce.

Photo: Clinton Muller

Photo: istock.com/Astrobobo

PRODUCTION

Propagation – includes the germination and sale of emerged plant seedlings and vegetative material.

Grow-out nurseries – includes business to business trade that grow out plant seedlings to market specifications.

Advanced nurseries – inclusive of mature plants as determined by the variety, examples would include a plant greater than 6 months old or a plant in a 35cm or greater pot size.

MARKETS

Retail – direct sale of plants to consumers, including independent and chain retailers.

Greenlife market / plant broker – wholesale market for plants.

Landscape – commercial installation of plant products and design for landscape aesthetics.

Revegetation & forestry – plants for environmental revegetation or forestry plantation.

Parks & gardens – sale of plants to public greenspaces and gardens.

Primary production & agricultural industries – sale of germinated seedlings or tree stock for production horticulture crops.

Interstate & export – sale of plant material interstate or international markets beyond Victoria.

2 METHODS

This section outlines the method used to estimate the economic contribution of the Victorian Nursery and Garden Industry. Two indicators of economic contribution were used:

- **Output** (measured by value of end point turnover); and
- **Employment**.

The following sections define and outline the method used to measure these indicators.

2.1 OUTPUT

2.1.1 DEFINITION OF OUTPUT

Output measures the total value of sales by the nursery and garden industry. Output is commonly used as a measure of economic contribution, particularly in the agriculture sector (where output at the farmgate is often used as a measure of economic contribution).

Gross value added is another indicator that is used to measure the economic contribution of industries. Essentially gross value added is output minus the value of inputs from other industries (thus representing the gross value that is added by the industry itself). Measuring gross value added requires more sensitive data than output and was avoided to maximise industry participation in the data collection.

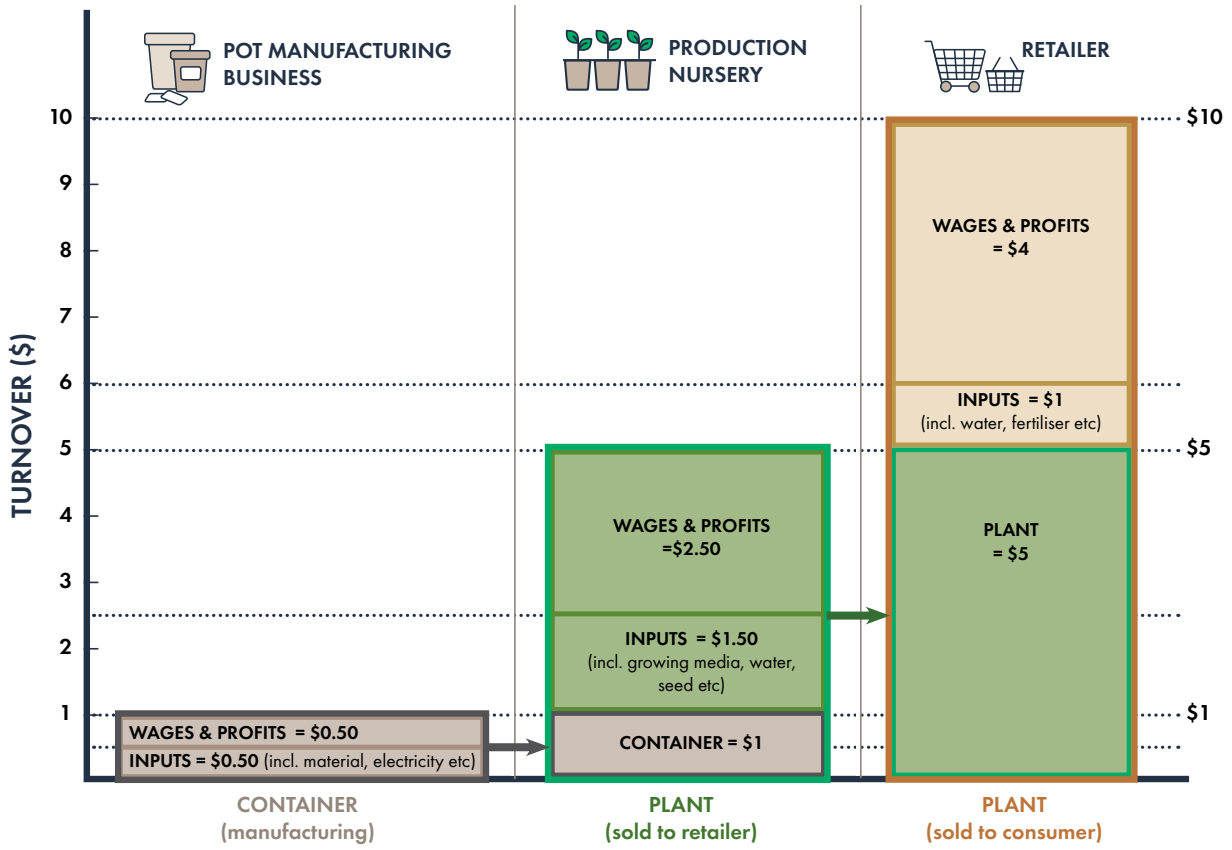
The value of inputs purchased by the industry is relevant to how much that industry contributes to the economy. From this point of view output is more relevant than gross value added. Further detail on the calculation of output is provided in **Appendix 1**.

2.1.2 ONLY ENDPOINT SALE VALUE INCLUDED

The calculation of output only includes the endpoint sale, or where the product is sold to a user outside the supply chain. This method is used to avoid double counting. In the example in **Figure 2.1** the output of a single container plant was measured as the endpoint sale of $10. This value incorporates the value of the preceding steps in the supply chain. The value is not added for every step in the supply chain (which would be $16).

Photo: istock.com/kruwt

FIGURE 2.1 WORKED EXAMPLE OF OUTPUT FOR A CONTAINER PLANT



2.1.3 DEFINING THE ENDPOINT SALE

As described above, it is important to define the endpoint sale to avoid double counting. The end point sale could be a product sold to a:

1. Consumer (usually through a retailer, but not necessarily as some production nurseries sell directly to consumers)
2. Business in another industry, including:
   - Primary and agriculture industries
   - Revegetation and forestry
   - Parks and gardens
   - Landscape; or
3. Business located interstate or overseas.

A sale to another business within the Victorian nursery and garden industry is not counted. **Table 2.1** on the follwing page outlines what type of sales are included in the calculation and provides some examples of the type of sales.

Photo: istock.com/Robert Moore

TABLE 2.1 Included output for each stage in the nursery and garden industry

SALE TYPE	INPUTS	PRODUCTION	RETAIL
Direct to consumer	NA	Included (e.g. online sale of plant to consumer	Included
Other industry	**Included** (e.g. sale of growing media to botanic garden)	**Included** (e.g. sale of seedling to forestry business)	NA
Exported (interstate/ international)	**Included** (e.g. sale of container to interstate nursery)	**Included** (e.g. sale of plant to interstate retail nursery)	NA
Sold within Victorian nursery and garden industry	**Excluded** (e.g. sale of growing media to Victorian nursery)	**Excluded** (e.g. sale of plant to Victorian retail nursery)	NA

2.2 EMPLOYMENT

Employment is measured as the total peak number of people employed. Total employment was chosen over full time equivalent (FTE) employment as it:

- Was more accessible for nursery businesses to provide this information for the purposes of the project data collection methods
- Aligns with many other measures of employment, for instance employment data from the Census of Population and Housing is measured in total employees
- Accurately reflects the total number of employees in the sector.

Additionally, *peak* employment was chosen to capture the maximum employment level in each business.

Employment is an indicator of the value added at each stage, and unlike output (turnover), employment at each stage of the supply chain can be added to generate a total. Further detail on the calculation of employment is provided in **Appendix 1**.

Photo: istock.com/welcomia

2.3 DATA SOURCES

The data sources for the economic contribution involve combining existing sources with data from an industry survey. Data used to calculate output (turnover) and employment are described in **Table 2.2** on the next page.

The most sensitive variable is the estimate of the number of Victorian nursery production businesses. The national greenlife market analysis[1] calculates annual industry output based on a business survey, using an estimated population of 432 'greenlife production businesses' within

[1] Nursery Garden Industry Australia, Nursery Industry Statistics 2017-21 (NY17008)

Victoria. This estimate of greenlife production businesses figure is strongly disputed by the Victorian industry.

Through consultation undertaken through this study with NGIV and data collected from several input business supplying the production sector with pots, labels and growing media, the number of greenlife production businesses with an annual turnover of more than $500,000 per annum, has been modestly assessed at 1,000. While our analysis assumes that the Hort Innovation study underestimates the number of production nursery businesses, the average business size from the Hort Innovation study was retained, with the estimates scaled up to 1,000 businesses.

TABLE 2.2 Sources used to calculate output and employment in the Victorian nursery and garden industry

	OUTPUT	EMPLOYMENT
INPUT		
Input business exports (interstate/international) and sales to other industries	Survey data. The aim of the survey was to obtain as close to 100% coverage of input businesses as possible. No scaling up of this data occurred.	
PRODUCTION		
Victorian nursery production	Australian Horticulture Statistics Handbook 2020/21. Scaled up to 1,000 businesses.	Employment estimate from Greenlife Industry Australia (2021) Greenlife in Urban Australia. Scaled to 1,000 businesses.
Cut flower production	Australian Horticulture Statistics Handbook 2020/21.	Estimated by applying employment to turnover ratio from survey data to cut flower turnover statistics from the Australian Horticulture Statistics Handbook 2020/21.
Turf production	Australian Turf industry 2020/21 Snapshot Report (Tasmanian production removed based on proportional population).	Estimated by applying employment: turnover ratio from survey data to turf turnover statistics from the Australian Turf industry 2020/21 Snapshot Report.
Production nurseries within parks and gardens	Estimated by applying nursery sector employment : turnover ratio to parks and gardens employment estimates.	Direct contact.
MARKETS		
Retail margin	Retail margin calculated from survey data for independent retailers and an industry benchmark for large retailers.	Retail employment to turnover ratio applied to output estimate.

2

2.4 INDUSTRY SURVEY

An industry survey was designed and distributed to supply chain participants within the Victorian nursery and garden industry.

2.4.1 SURVEY DESIGN

The survey was segmented dependent on both the function of an operator in the supply chain as well as the market which an operator sells to. For example, an operator may conduct propagation as well as sell to consumers.

Due to segmentation, the survey was kept brief to maximise responses, with an average completion time of 11 minutes.

A focus of the survey design was on quantitative data, with minimal open-ended questions.

The two parts of the survey included:

- Part A – mostly about businesses' output/turnover, employment, location, markets
- Part B – projected growth/decline and future employment needs.

The survey was distributed via SurveyMonkey.

Photo: Clinton Muller

2.4.2 TARGET STAKEHOLDERS

The primary stakeholder groups targeted through the data collection were industry supply chain participants, inclusive of:

- Input businesses such as:
  - » Plant material and seed
  - » Growing media
  - » Containers and labels
  - » Infrastructure and technology
  - » Crop protection and nutrition
  - » Agronomic advice
  - » Transport and logistics
  - » Education and training
- Production businesses such as:
  - » Propagation
  - » Grow-out nurseries (inclusive of business-to-business transaction)
  - » Advanced nurseries
- Markets
  - » Retail
  - » Greenlife Market / Plant Broker.

2.4.3 DISTRIBUTION

The survey was distributed directly by NGIV to an existing industry database and an external targeted non-member list via:

- Email invitation and follow-up reminders
- SMS alert
- Word of mouth from NGIV board members
- Targeted phone calls to invite participation.

The survey was open between December 2021 to February 2022.

2.4.4 SURVEY RESPONDENTS

A total of 102 responses were received, with a breakdown of distribution by business type in the supply chain illustrated in Figure 2.2 right.

Following data cleaning, 65 responses were used to inform the economic analysis and industry forecast, and 60 responses for the skills needs.

A representative sample of industry businesses was captured through the survey. This included a range of businesses sizes by turnover as described in Table 2.3 on the next page.

FIGURE 2.2 RESPONSE DISTRIBUTION FOR INDUSTRY SURVEY

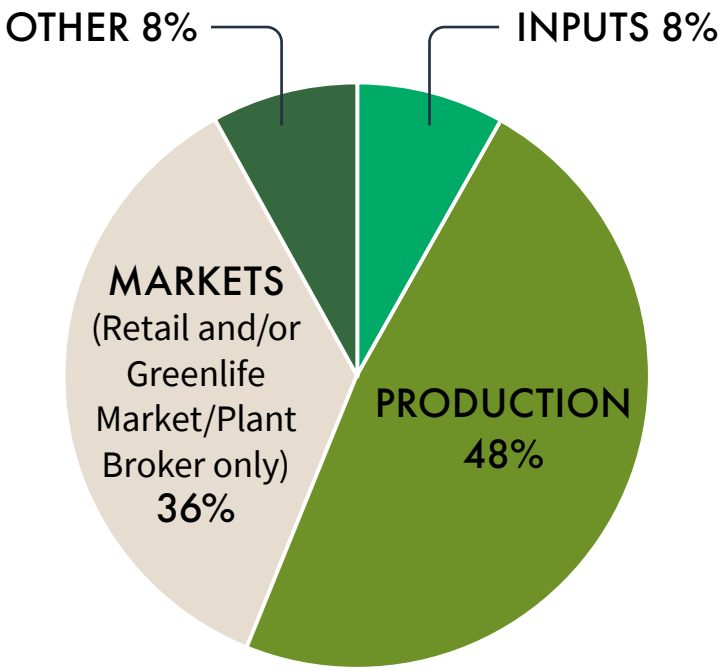
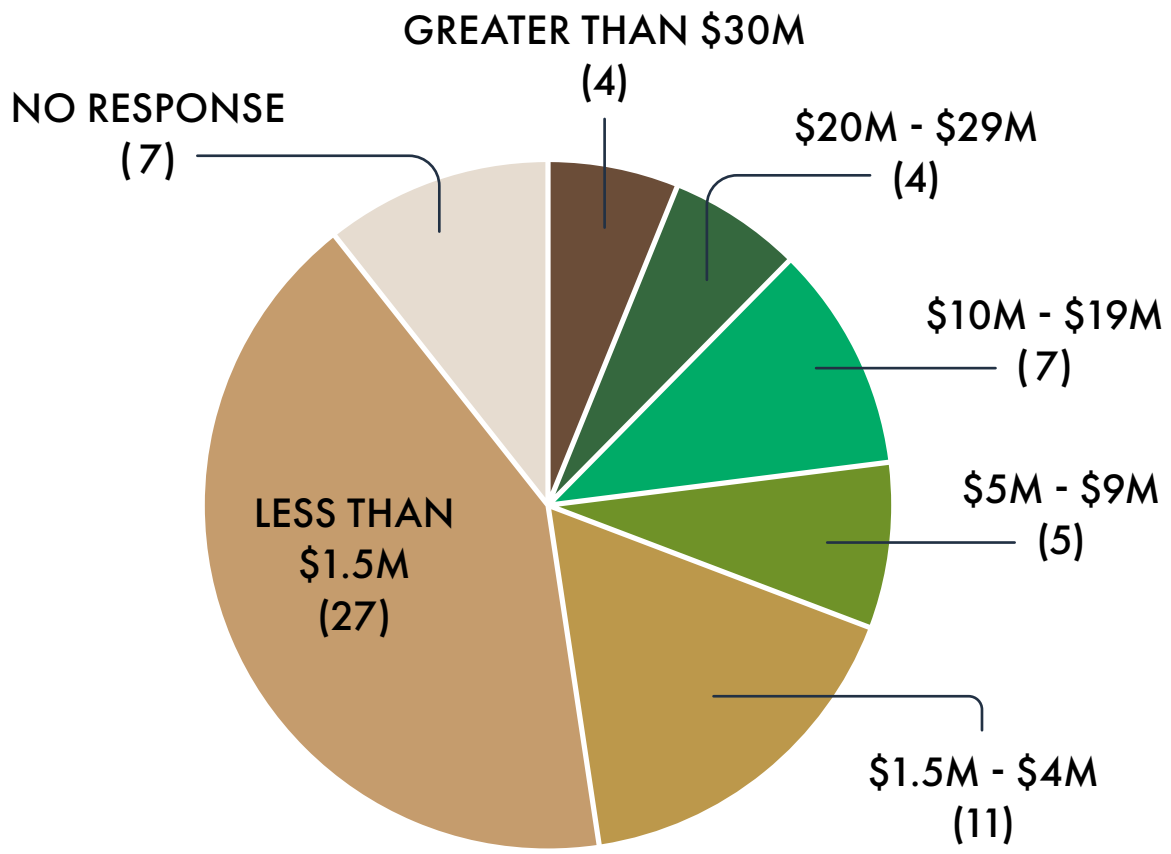


FIGURE 2.3 REPRESENTATIVE SAMPLE OF SURVEY RESPONDENTS' BUSINESS VALUE 2020-21 FINANCIAL YEAR



2.4.5 SURVEY RESULTS

The results of the survey responses and analysis are presented in the subsequent sections of the report, including:

- **Section 3** outlining current snapshot of the Victorian Nursery Industry
- **Section 4** providing an overview of forecast growth opportunities
- **Section 5** outlining the industry challenges, including current and future skills.

2.5 INDUSTRY VALIDATION

A data validation workshop was held with key representatives and supply chain participants of the Victorian nursery and garden industry at Powerplants in Hallam on the 16 March 2022. The workshop provided an opportunity to discuss and validate the project results as to inform the finalisation of this report.

Photo: istock.com/ martinhosmart

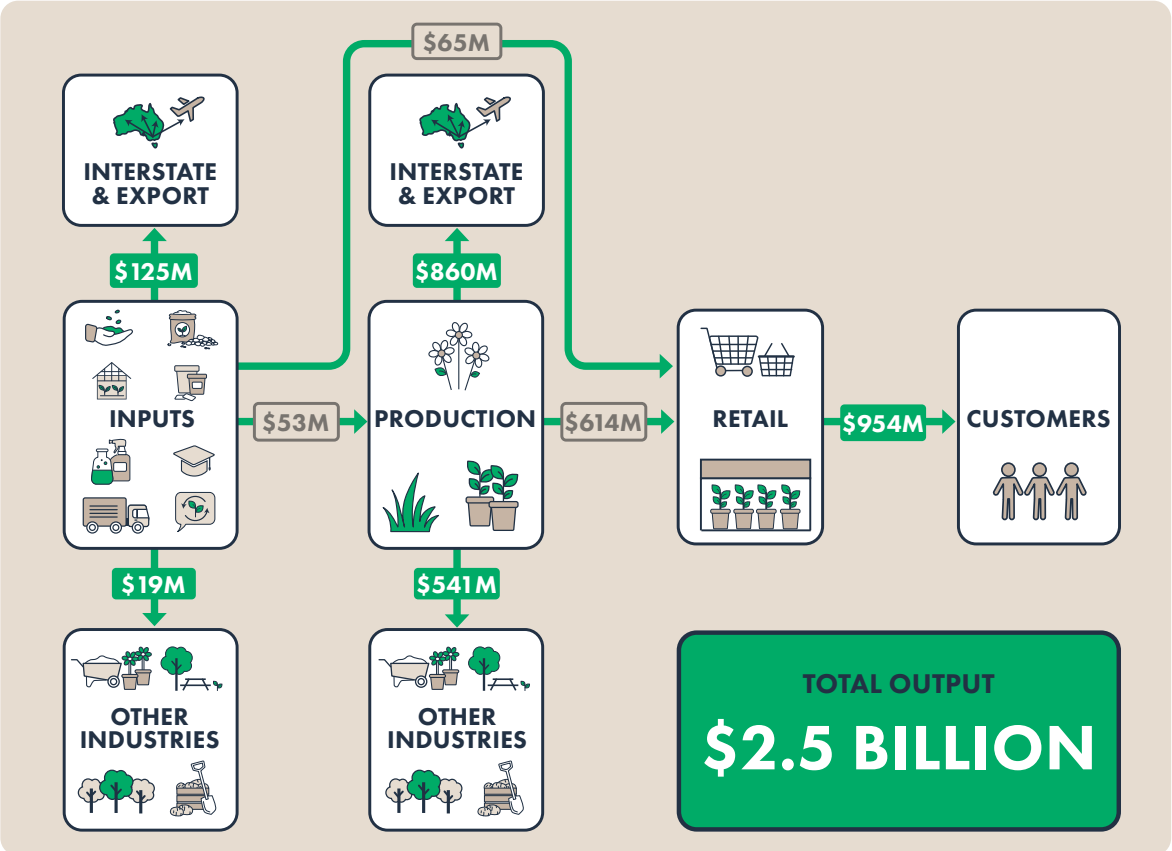
3 VICTORIAN NURSERY INDUSTRY SNAPSHOT

3.1 OUTPUT

The output of the Victorian nursery and garden industry in 2020/21 was estimated to be **$2.5 billion**. Output is based on the value of endpoint sales only, meaning that it has been calculated to remove double counting (for instance a plant that is sold multiple times within the industry is only valued once). This approach provides a conservative estimate of industry value given that business to business trading is not included.

The output value is visualised in Figure 3.1 below for each segment of the supply chain. The calculation of this estimate is described in Appendix 1.

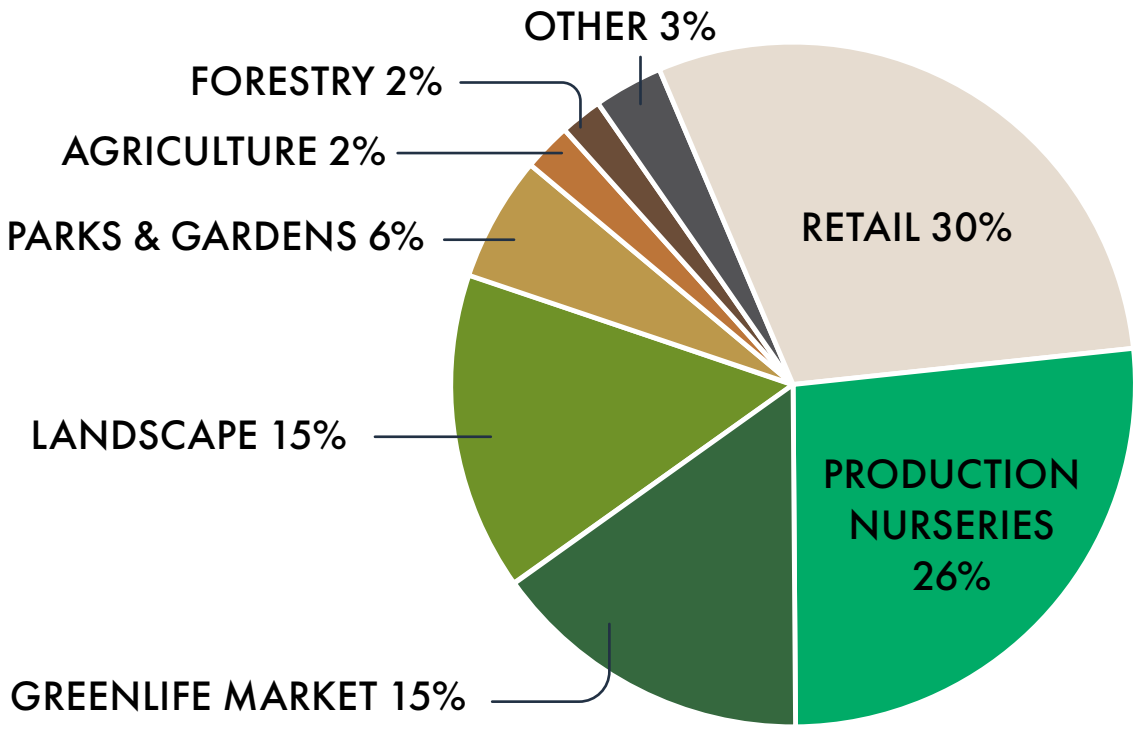
FIGURE 3.1 VICTORIAN NURSERY INDUSTRY OUTPUT VALUE BY SUPPLY CHAIN SEGMENT



3.2 OUTPUT BY MARKET

Markets where production nurseries sell their product (weighted by turnover) is shown in Figure 3.2 on the following page. The largest markets are retail (30%), production nurseries (26%), greenlife markets (15%) and landscape (15%). Production nurseries sell plants to other production nurseries further down the supply chain for value adding.

FIGURE 3.2 MARKET SHARE FOR VICTORIAN NURSERY PRODUCTION

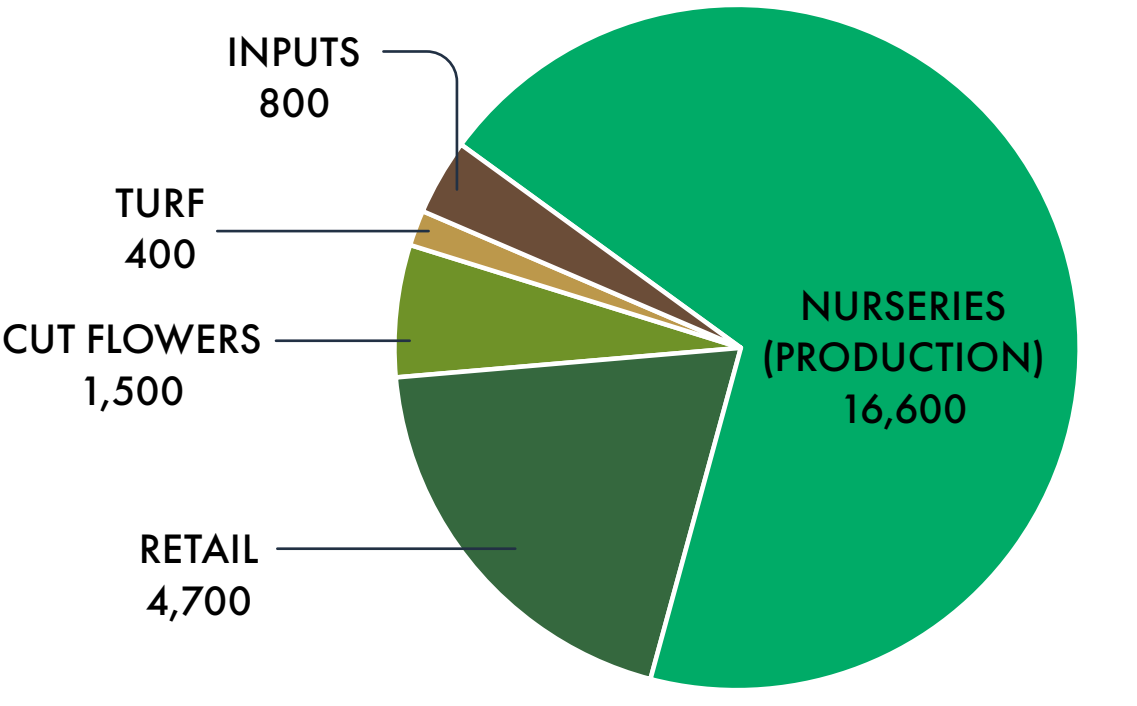


3.3 EMPLOYMENT

It is estimated that the industry employs **24,100** people. The majority of this employment is in production nurseries. The calculation of this estimate is described in Appendix 1.

A breakdown of the employment in the industry is shown in Figure 3.3 below.

FIGURE 3.3 EMPLOYMENT IN THE VICTORIAN NURSERY AND GARDEN INDUSTRY



3.4 PRODUCTION NURSERY LOCATION

Location of current garden and nursery businesses who participated in the survey (n=65), by local government area, is outlined in **Figure 3.4** below. This map highlights a concentration of businesses in the Yarra Ranges and Mornington Peninsula.

FIGURE 3.4 NURSERY AND GARDEN INDUSTRY LOCATION OF CURRENT OPERATIONS

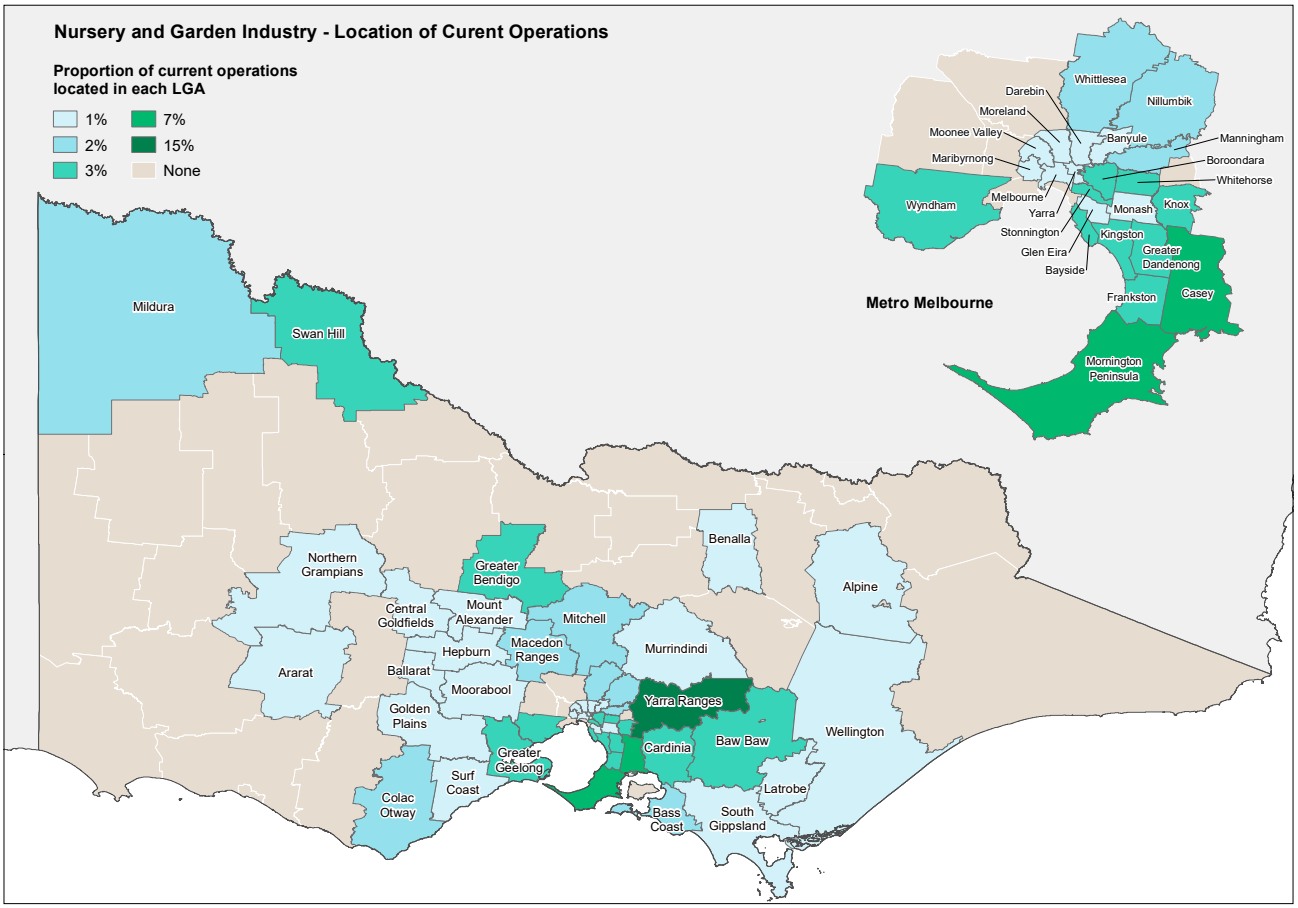
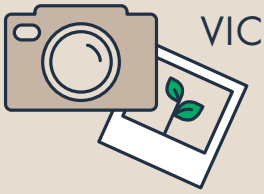


Photo: NGIV



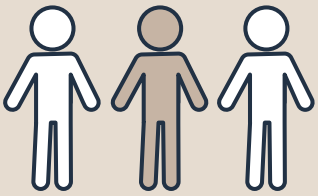
VICTORIAN NURSERY INDUSTRY SNAPSHOT

TOTAL ECONOMIC OUTPUT

$2.5 BILLION

POSITIVE OUTLOOK

75% production businesses likely to expand in future

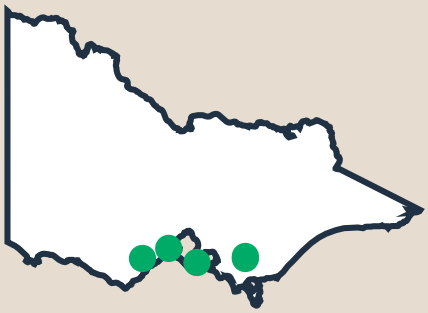


24,100

people employed

GROWTH FORECAST AREAS

in Mornington Peninsula, West Gippsland and Geelong and the Surf Coast



KEY CHALLENGES:

Skilled labour
Casual labour
Cost of production /profitability
Weed, pest & disease management

4 VICTORIAN NURSERY INDUSTRY OUTLOOK

4.1 PROJECTED GROWTH

Businesses who participated in the survey (n=65) indicated a positive growth outlook, as illustrated in **Figure 4.1** below, with 74 per cent of respondents indicating expansion of their business in the near future, with just over one quarter remaining stable. No businesses who responded to the survey identified a contraction of their current business activities.

FIGURE 4.1 PROJECTED BUSINESS IMMEDIATE FUTURE OUTLOOK

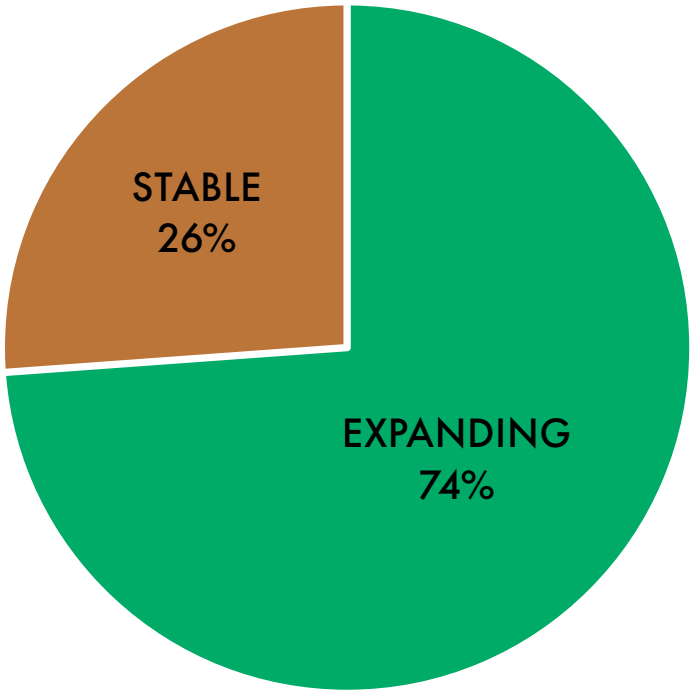
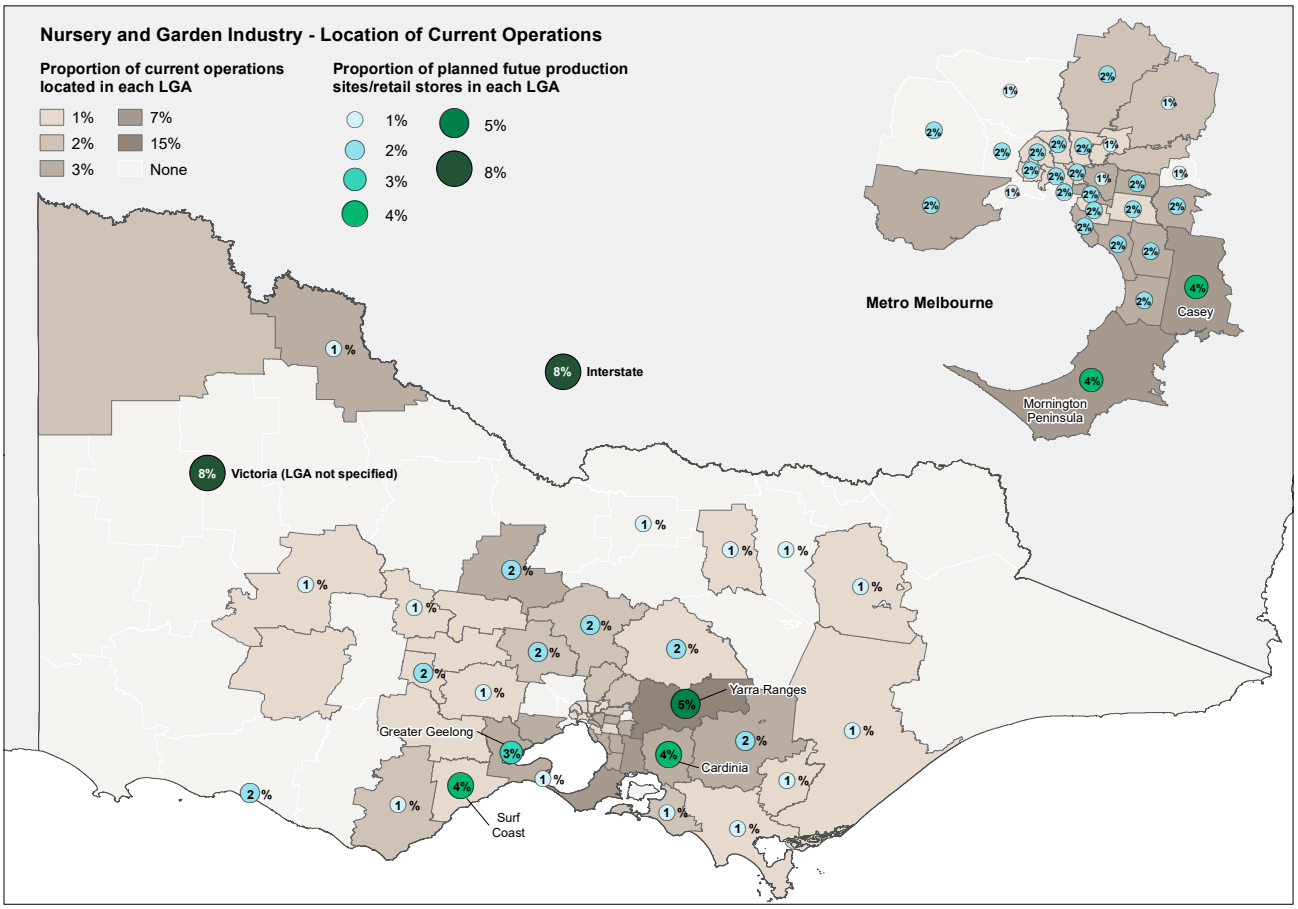


Photo: istock.com/Andrey Maximenko

4.2 GROWTH LOCALITIES

Projected local government areas for growth of nursery and garden businesses who participated in the industry survey (n=65) is outlined in **Figure 4.2** below. Key areas noted for growth opportunities include the Mornington Peninsula, West Gippsland and Geelong and the Surf Coast.

FIGURE 4.2 NURSERY AND GARDEN INDUSTRY LOCATION OF FUTURE OPERATIONS



5 SKILL NEEDS

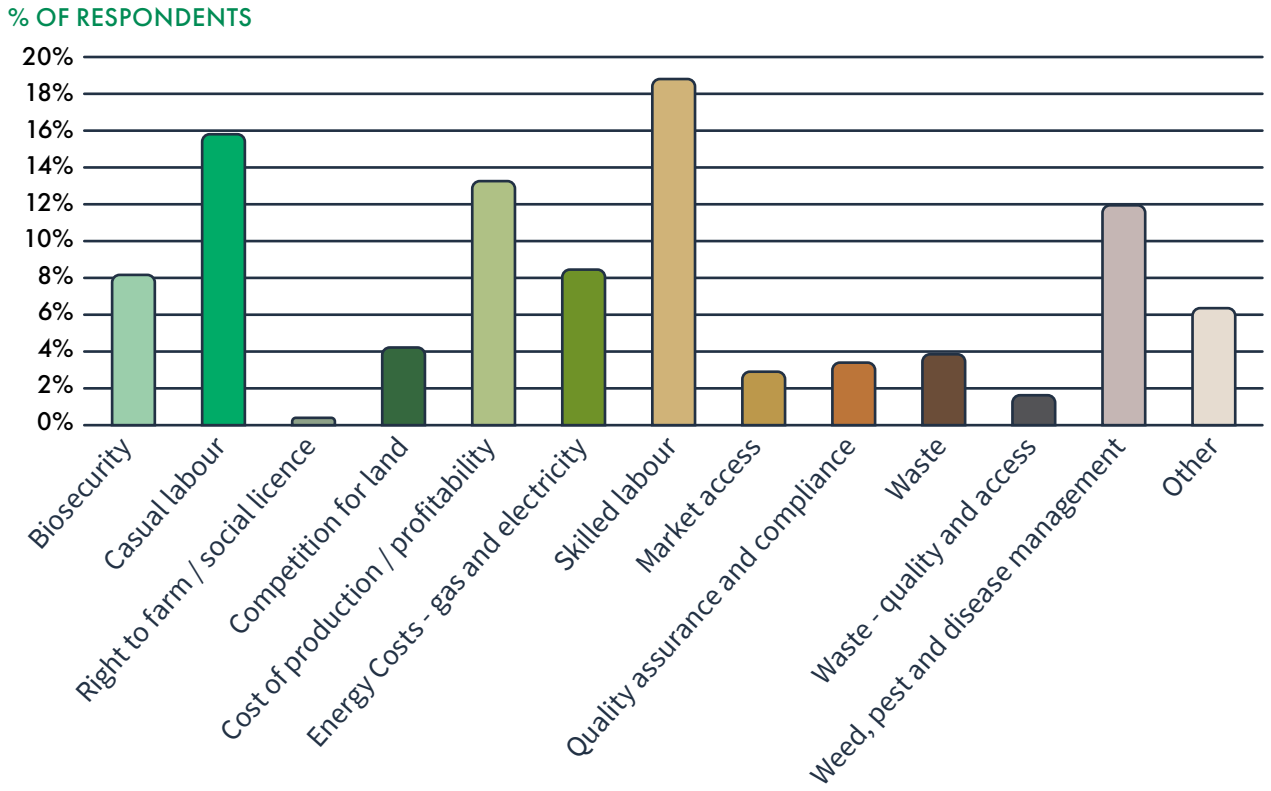
5.1 INDUSTRY CHALLENGES

Like many industries in Australia, workforce issues are a key challenge for the Victorian nursery and garden industry. Both skilled and casual labour were identified by survey respondents (n=60) as the main challenges facing businesses now and/or in the future as illustrated in **Figure 5.1** below.

The key challenges identified included:

- Skilled labour – 19%
- Casual labour – 16%
- Cost of production / profitability – 13%
- Weed, pest and disease management – 12%.

FIGURE 5.1 CURRENT AND/OR FUTURE CHALLENGES FACED BY BUSINESSES



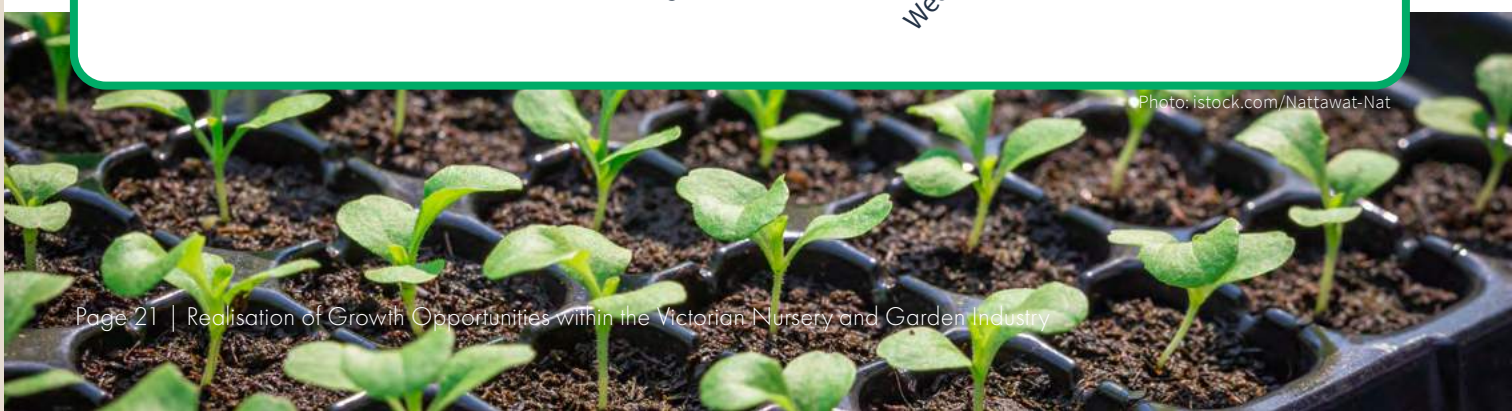


Photo: istock.com/Nattawat-Nat

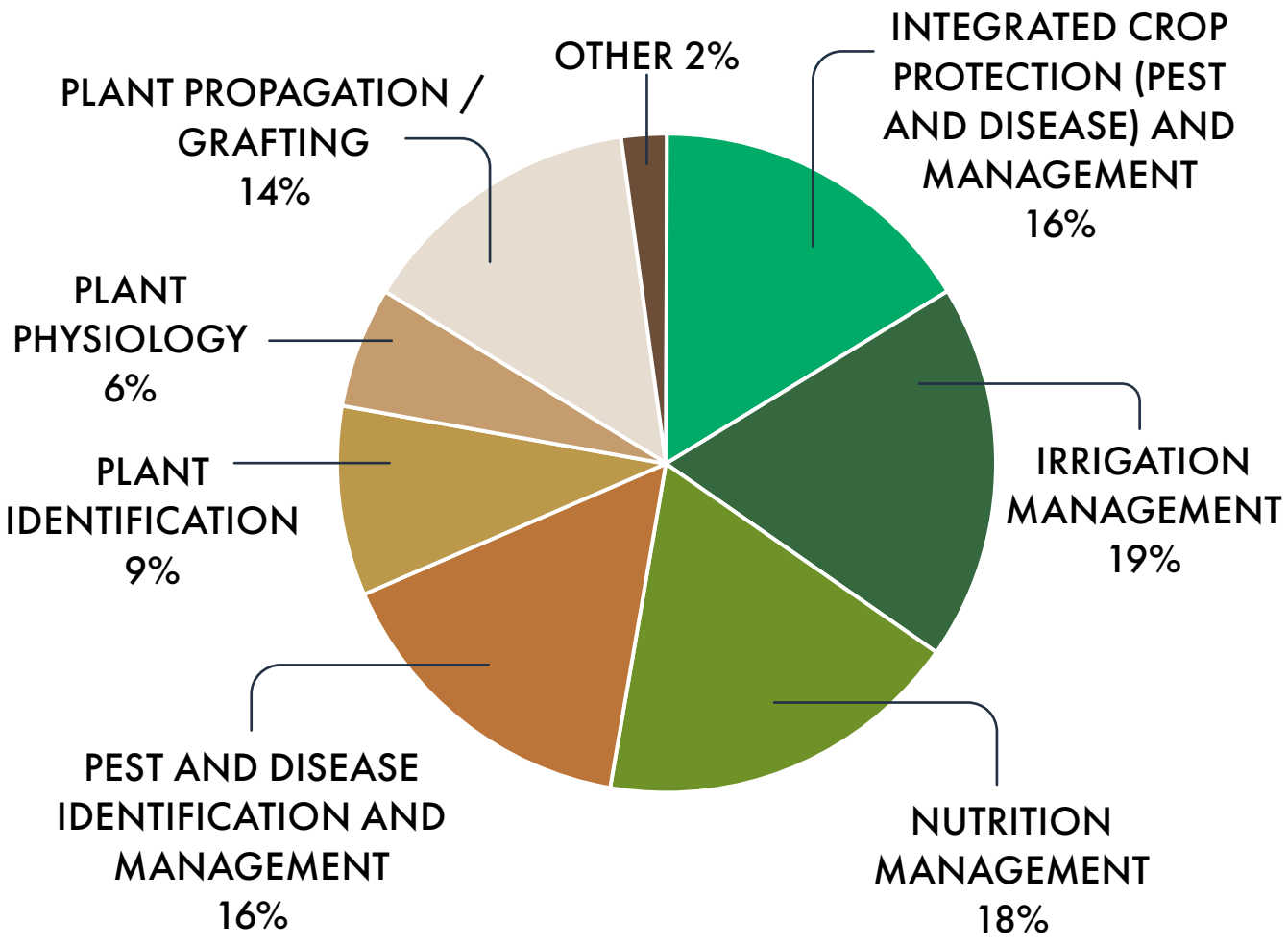
5.2 FUTURE SKILL NEEDS

This section is based on survey questions asking respondents (n=60) to consider the skill and aptitude needs for their future staff across several key categories relevant to businesses in the nursery and garden sector.

5.2.1 PLANT MANAGEMENT

Four key aspects of plant management are considered of relatively equal importance with respect to future priorities for staff skills and aptitude needs. These include irrigation management, plant nutrition management, identification and management of pests and diseases and integrated plant / crop protection and management (see **Figure 5.2** below). Knowledge and skills across all these aspects is critical for nursery and gardening business given the interconnection and impact that plant water use, fertilisers and pest and diseases have on plant health and growth. Unsurprisingly, plant propagation was also identified as an important future skill needed by businesses.

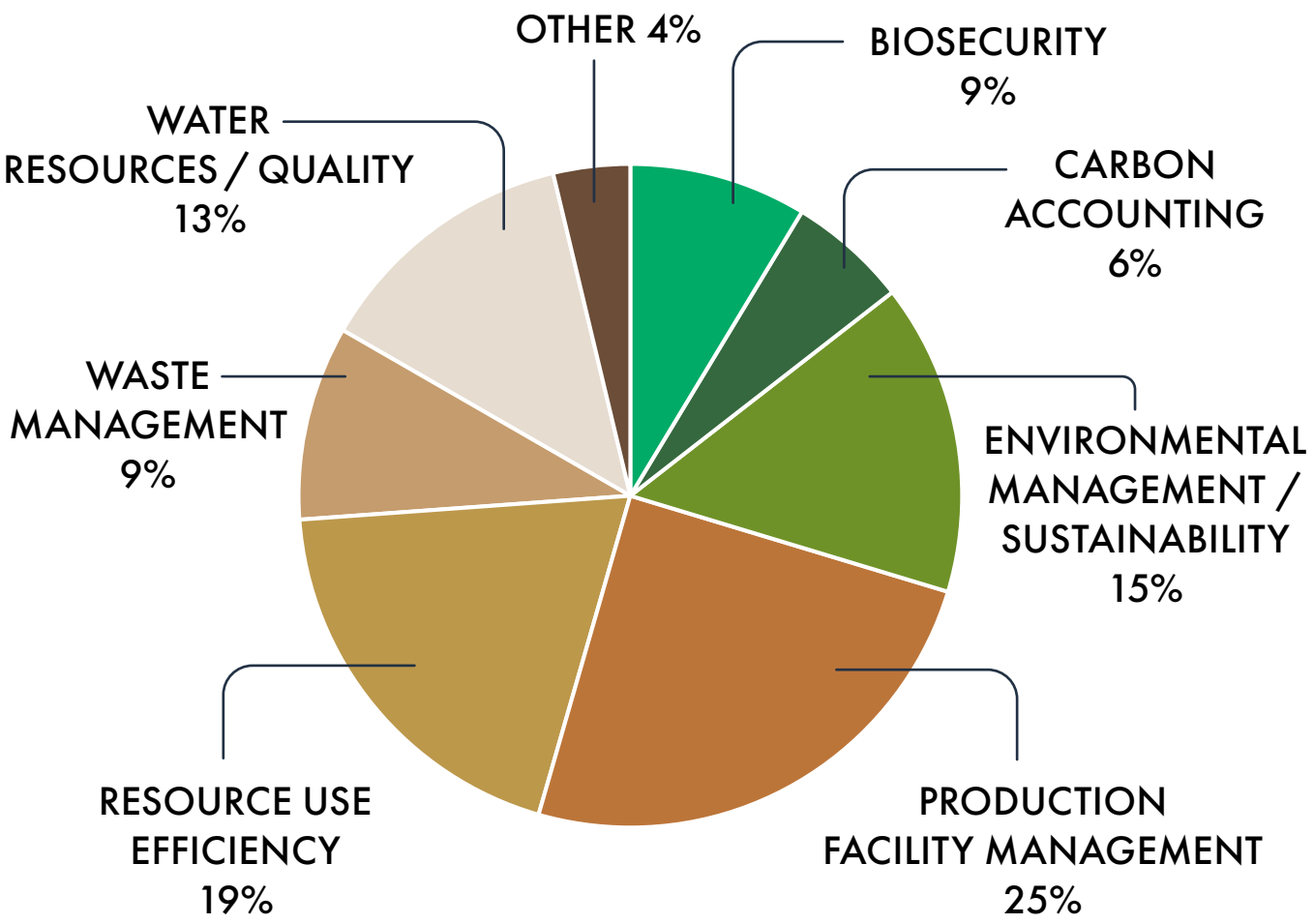
FIGURE 5.2 FUTURE PRIORITY STAFF SKILLS AND APTITUDE NEEDS IN THE PLANT MANAGEMENT AREA



5.2.2 PRODUCTION ENVIRONMENT

With respect to the production environment, businesses clearly prioritise the skills and aptitude for managing production facilities as a key future need (**Figure 5.3** below). Such skills and aptitude require a level of experience, knowledge and confidence to manage a range of facets and activities that contribute to successfully run a production facility. A collection of skill sets, and knowledge, is needed in such a managing role, and may include production planning / forecasting, project management, quality assurance, supervising staff, budgeting, ordering, technology and digital management and problem solving.

FIGURE 5.3 FUTURE PRIORITY STAFF SKILLS AND APTITUDE NEEDS IN THE PRODUCTION ENVIRONMENT AREA



Businesses responding to this survey question identified resource use efficiency and environmental management / sustainability as other key skill and aptitude priorities for the future. Given these factors are of increasing interest and concern to producers, consumers and other stakeholders, it is not surprising they have been identified by businesses as priorities and are related to the overall skills in managing a production facility.

5.2.3 TECHNOLOGY

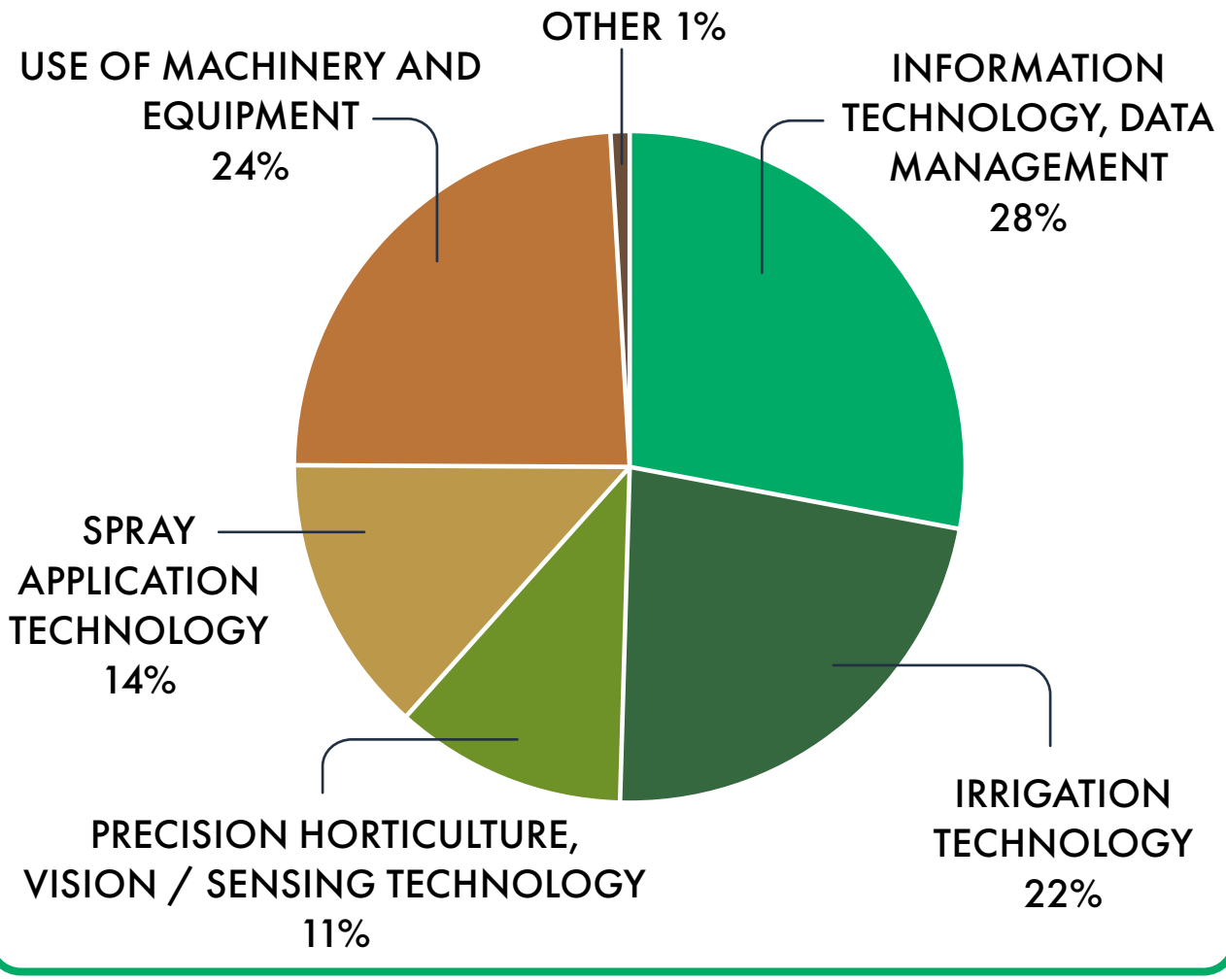
Many sectors are adopting a range of technologies to address labour shortages, improve production efficiencies, mitigate climate impacts and/or safety aspects. Like other horticultural industries, the nursery and garden industry are keen to prepare for future changes in technology, machinery and equipment.

Survey respondents indicated three main priorities for future technology skills and aptitude needs in their business. These include information technology / data management, use of machinery and equipment and irrigation technology (**Figure 5.4** below).

The ability to continually learn and adapt to new and changing technology and equipment will be critical to future prosperity of the nursery and garden industry.

Photo: istock.com/Astrobobo

FIGURE 5.4 FUTURE PRIORITY STAFF SKILLS AND APTITUDE NEEDS DEALING WITH TECHNOLOGY



5.2.4 BUSINESS MANAGEMENT

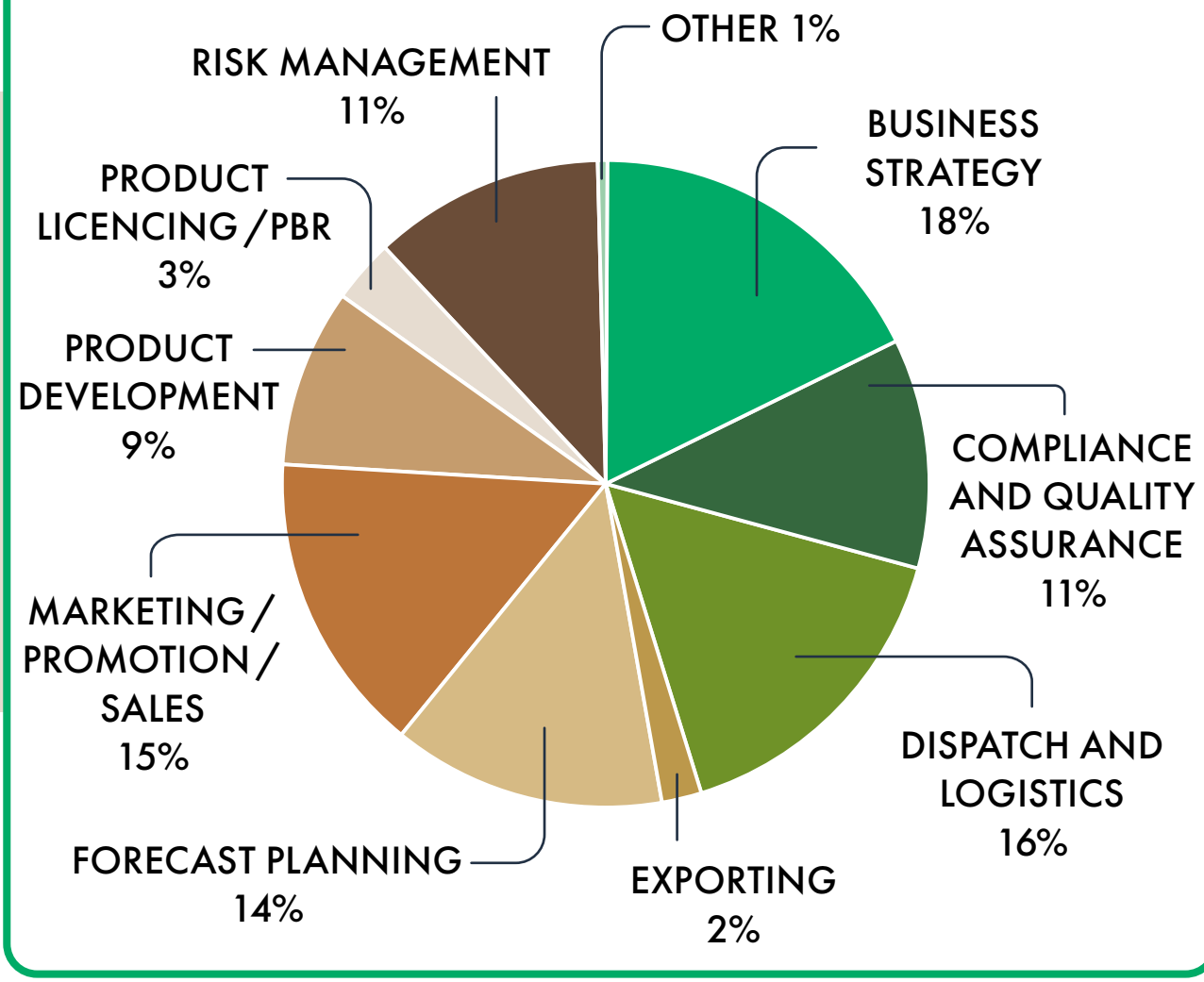
From a general business management perspective, survey respondents identified skills and aptitude in business strategy, dispatch and logistics and marketing (including promotions and sales) as their main priorities in the future (see **Figure 5.5**).

There is recognition by industry stakeholders that strategic skills in business planning, marketing and logistics are also needed to compliment sound technical production skills for sustainable business growth and to be profitable.

For businesses across many sectors, and their customers, recent COVID-19 impacts to logistics have highlighted the pressures and vulnerabilities across various supply chains. Many businesses, including those in the nursery and garden sector, are likely to be considering their future skill needs in this area as a result of recent disruptions.

Photo: Clinton Muller

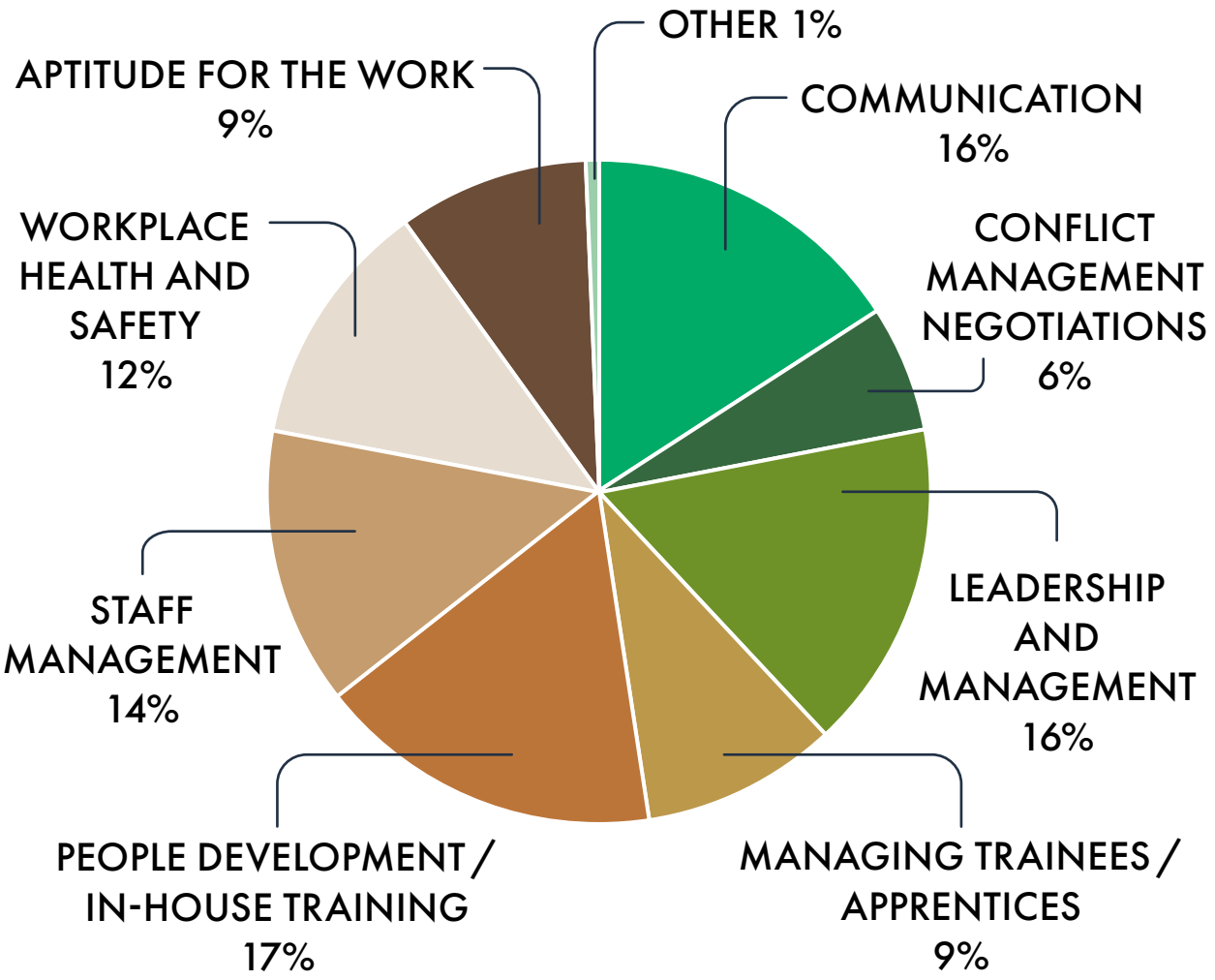
FIGURE 5.5 FUTURE PRIORITY STAFF SKILLS AND APTITUDE NEEDS IN BUSINESS MANAGEMENT



5.2.5 HUMAN RESOURCES / PEOPLE MANAGEMENT

Three priority skills and aptitude in the people management domain were identified by survey respondents as a future need. These included leadership and management, people development (including in-house training) and communication (see **Figure 5.6**). As a result of the interconnection between these skills and aptitudes, some 16 – 17% of survey respondents equally identified these as future priorities.

FIGURE 5.6 FUTURE PRIORITY STAFF SKILLS AND APTITUDE NEEDS IN HUMAN RESOURCES /PEOPLE MANAGEMENT



In a highly competitive employment market, leadership skills, effective communication and ability to support and develop people in the business will be critical if the industry is to attract and retain both skilled employees and casual labour. Beyond remuneration, many employees seek a supportive working culture and opportunities for learning and development in their roles.


Photo: Istock.com/welcomia

5 5.3 FUTURE INNOVATIONS

As previously noted, advancements in technology and equipment are being readily adopted across the horticulture and agriculture sectors, with the purpose of improving efficiencies, minimising waste, addressing labour issues, reducing repetitive manual activities and / or improving safety.

In considering potential future innovations to incorporate in their business, the following proportion of the survey respondents (n=60) identified these key areas (**Figure 5.7**):

- 17% - Sustainability / waste management / circular economy
- 16% - New materials (e.g. different soil mixtures, biodegradable pots)
- 14% - Internet of things (interconnected hardware systems through use of internet).

FIGURE 5.7 FUTURE TECHNOLOGY ADVANCEMENTS BUSINESSES ARE LOOKING TO INTRODUCE IN THEIR OPERATIONS

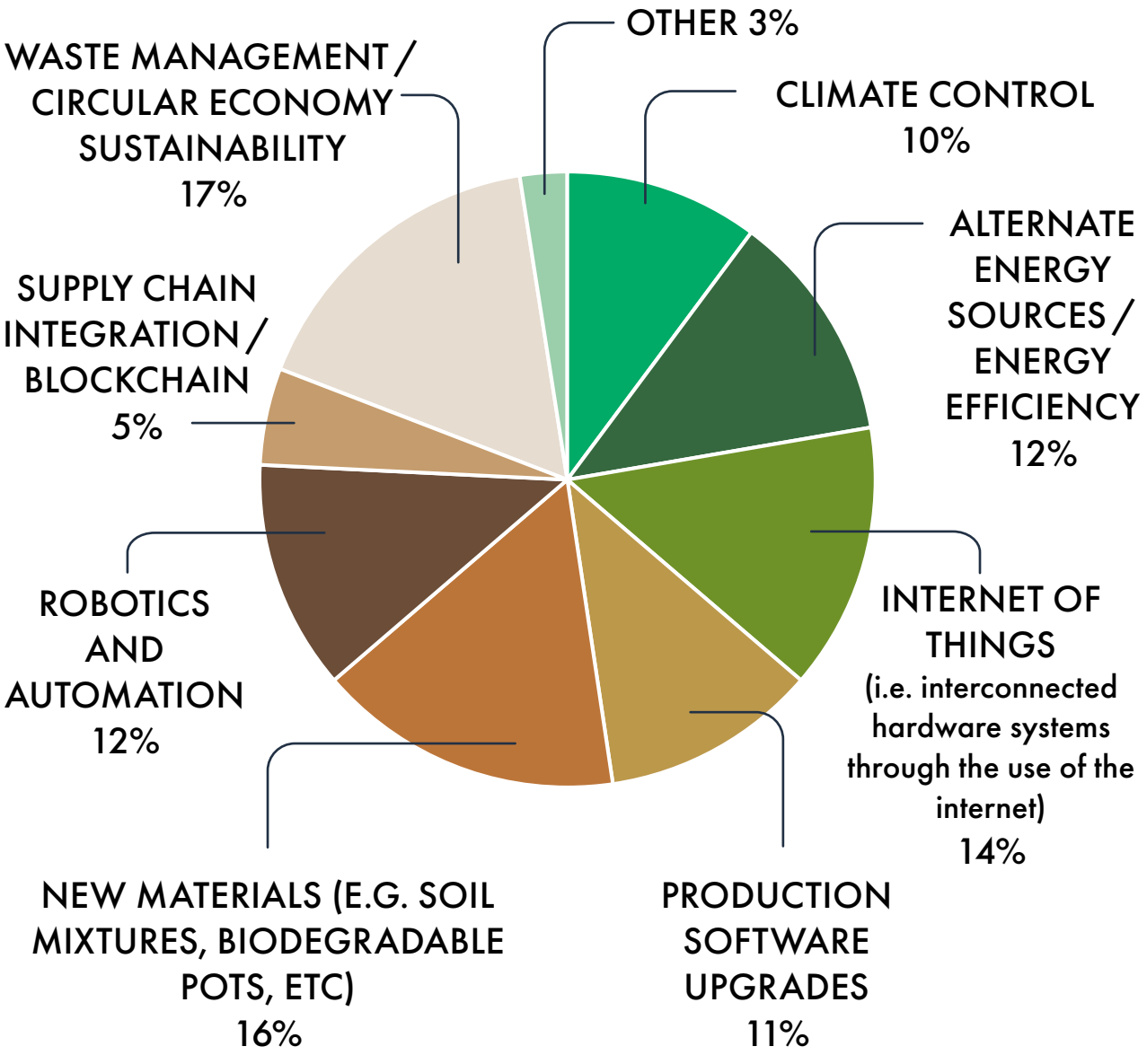


Photo: Clinton Muller

Businesses are clearly considering the sustainability of their operations in the future, which is likely to encompass minimising waste, resource efficiency, recycling and broader concepts of the circular economy. For many in the nursery and garden industry, it is important that the 'clean and green' image of the sector is underpinned by practices and technology that align with this image.

Possibly linked to this concept, is the exploration of new production materials to introduce into the business. This may include different soil mixes, biodegradable pots, and other input materials that help to improve overall production, minimise waste and / or reduce input costs.

With advancements in technology, including decreasing costs and increasing simplicity of use, businesses are also looking to introduce innovation that supports connection of devices (equipment and hardware) with the internet. The 'internet of things' (IoT) is being made possible as access to the internet becomes readily available with reducing cost of connection, more devices being developed with built-in Wi-Fi capabilities and sensors and smartphone ownership. For businesses in the nursery and garden sector, IoT innovations offer potential to reduce time, improve efficiencies and precision of production activities (e.g. irrigation, glasshouse operations).

6 RECOMMENDATIONS

The Victorian nursery and garden industry is a significant contributor to the Victorian economy, with an estimated output value of $2.5 billion and total employment of 24,100. Despite current challenges around staff recruitment and retention and increasing freight / logistics costs, the diverse nature of the industry demonstrates resilience to future challenges and maintains an optimistic outlook for future growth and expansion.

Key opportunities identified through the course of this study to support the continued growth of the Victorian nursery and garden industry include:

Promotion of **green infrastructure** and **re-greening initiatives** to facilitate action on climate change and improved liveability of built environments

Strategic collaboration with targeted local government, water and other utilities to support **sector expansion and growth**

Investment into appropriate and industry relevant technologies, infrastructure and teaching staff within **education and training** facilities

Targeted investment and focus on addressing **emerging priority skill gaps** in the industry workforce, including:

- **Plant management** – including nutrition management, irrigation management, integrated crop protection and pest and disease identification and management.
- **Production environment** – including production facility management, resource use efficiency and environmental management/sustainability.
- **Technology** – including information technology, data management, machinery and equipment use and irrigation technology.
- **Business management** – including business strategy, dispatch and logistics and marketing/promotion/sales.
- **Human resources / people management** – including people development / in-house training, communication and leadership and management.
- **Future innovations** – including waste management / circular economy / sustainability, internet of things and new emerging materials.

Promotion, attraction and retention strategies for growth of **skilled workforce**

Facilitate **geographic industry growth** opportunities, including planning instruments, recycled water and energy infrastructure, in the Mornington Peninsula, West Gippsland and Geelong and the Surf Coast regions.

Further exploration and investment into unique interstate and international export opportunities through an **export strategy** addressing barriers to market access, product development and intellectual property

Pursuit of scoping for **Horticulture Centre of Excellence** to facilitate education and training, partnerships and collaboration, research and development and greenlife market for the Victorian industry.

Photo: NGIV

A APPENDIX

APPENDIX 1: CALCULATION OF OUTPUT (TURNOVER) AND EMPLOYMENT

The methods to calculate output and employment are shown below.

As output accumulates along the supply chain the estimates for retail and allied exports do not represent the relative value of those segments. That is, the figure for production nurseries, cut flowers and turf represents the entire output for industry segments, while the figures for retail and allied segments represent marginal output that is not already included in other segments.

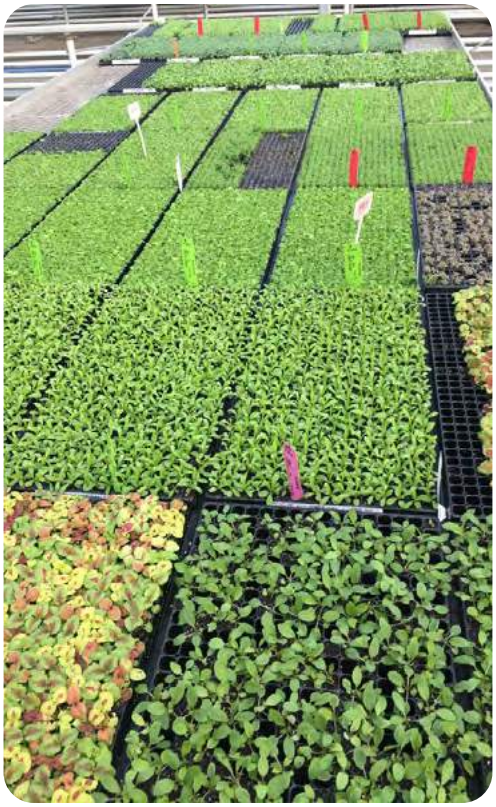


Photo: Clinton Muller

TABLE A1-1 Calculation of output

SEGMENT	OUTPUT ($M)	CALCULATION/SOURCE
Production nurseries	1,808	Australian Horticulture Statistics Handbook 2020/21, scaled to 1,000 businesses
Cut flowers	160	Australian Horticulture Statistics Handbook 2020/21
Turf	45	Australian Turf industry 2019/20 Snapshot Report
Retail margin on nursery products	257	Calculation based on survey data and consultation (37%)
Parks and gardens (nurseries)	3	Based on employment in parks and garden nurseries data supplied by NGIV
Allied 'exports'	227	Survey data. Includes interstate/international exports and sales to other industries (landscapers, parks and gardens).
Total	**2,500**	

TABLE A1-2 Calculation of employment

SEGMENT	OUTPUT (#)	CALCULATION/SOURCE
Nurseries (production)	16,604	Employment estimate from Greenlife Industry Australia (2021) Greenlife in Urban Australia. Scaled to 1,000 businesses.
Cut flowers	1,535	Estimated by applying employment to: turnover ratio from survey data to cut flower turnover statistics from the Australian Horticulture Statistics Handbook 2020/21
Turf	436	Estimated by applying employment: turnover ratio from survey data to turf turnover statistics from the Australian Turf industry 2020/21 Snapshot Report
Retail	4,682	Retail employment to turnover ratio applied to output estimate
Parks and gardens (nurseries)	27	NGIV
Allied employment	792	Online Survey data and targeted industry phone interviews
Total	**24,075**	

Photo: istock.com/ Srinuan Hirunwat