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Growing Globally – RD&E Review for the Australian nursery industry

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WHY DO A REVIEW?

Like many horticultural industries, the nursery and garden industry faces a number of challenges which impact on its ability to grow and innovate. There are opportunities to address these issues through targeted research, development and extension (RD&E). Changes to the RD&E provider landscape and reducing public funds has meant that RD&E needs, more than ever, to deliver greater returns on investment. Collaboration with international RD&E providers and learning from others is a great way to leverage investment, share resources and identify new opportunities.

HOW DID WE DO IT?

RMCG conducted a global desktop/literature review and consultation with key industry members and research agencies to:

- Identify the main issues the nursery industry is facing globally and, from an RD&E viewpoint, the major drivers for industry
- Assess these issues against the current operating environment and prioritise accordingly
- Identify RD&E capability (people) and capacity (facilities) globally
- Detail current international and Australian RD&E programs
- Develop a RD&E roadmap which will enable industry to develop a targeted program that delivers desired outcomes for nursery businesses and builds industry capacity.

We used a Now (Current), Where (Future), How (Roadmap) approach to determine RD&E priorities and delivery.

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WHAT DID WE FIND?

KEY RD&E PRIORITIES

The review of current R&D activity highlighted five important issues for industry moving forward:

- Reducing the environmental footprint through improved resource use efficiency
- Improving production and process efficiencies (both in the field and within protected cropping systems)
- Reducing production costs through automation and uptake of new technology
- Improving supply chain efficiencies and logistics
- Improved understanding by industry of end user needs/desires.

CHALLENGES

Of concern is the:

- Current disconnect between industry and R&D providers
- Lack of extension program
- Diversity of business size, capacity and attitude within the nursery industry and the impact this will have on the ability of individuals to adopt new technology and practices
- Lack of communication and coordination between the production sector, retailers and consumers.

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AUSTRALIAN RD&E CAPACITY AND CAPABILITY

The review identified that given direction and investment from industry there is extensive capacity and capability within Australia to conduct RD&E that will address key issues. In fact, Australia is leading the way globally in a number of research fields of relevance to the nursery industry including:

- The use of Next Generation Sequencing technology to improve the efficiency of screening process for biosecurity at Murdoch University
- Increasing the level of green infrastructure in urban space by the Green Infrastructure Research Group at Melbourne University
- The development of new tissue culture systems to improve the time taken to generate new seedlings at QAAFI and University of Tasmania
- The development of new technology for monitoring of plants and the automation of production tasks at University of Sydney and UNE
- Production of plants within a protected system (glasshouses/greenhouses) at the University of Western Sydney.

"Australia is punching well above its weight, but collaboration with global research providers could take it to the next level."

INTERNATIONAL RD&E ACTIVITY

Internationally, R&D for the nursery industry is driven by stringent regulations around resource use and finding ways to offset reducing labour availability. This is particularly evident in Europe (Germany and the Netherlands), the United Kingdom and in particular regions of the United States. There are opportunities for the Australian industry to learn from the R&D that is currently occurring in these countries and adopt practices and technology to our conditions and systems. Of particular interest to the Australian nursery industry is research focussed on:

- Reducing the environmental footprint through better resource use efficiency (conducted in Germany, the Netherlands and the US due to increasing regulation)
- Improving systems and practices through:
    - Better greenhouse/protected cropping design (University of Wageningen in The Netherlands)
    - Managing labour shortages and costs (SmartHort program – Agriculture Horticulture and Development Board in the UK)
    - Agri-technology and automation (AHDB, University of Wageningen and private providers)
- Understanding consumer behaviour and purchasing patterns (Michigan University and Texas A&M University in the USA)
- Urban greening and 'Green Care' (Vineland Institute in Canada, University of California, and Germany).

"International RD&E providers we talked to were enthusiastic about the prospect of collaborating with Australian R&D providers for the betterment of nursery growers worldwide".

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CASE STUDY – WAGENINGEN UNIVERSITY AND RESEARCH

The Netherlands is home to one of the world's leading horticultural universities, Wageningen University and Research (WUR), which has extensive capabilities, experience and facilities to conduct innovative R&D for the nursery industry.

Current priority research areas at WUR include the reuse and recycling of water, energy and climate management, as well as next generation sequencing for biosecurity screening, all of which are incredibly relevant to growers here.

Wageningen's name keeps popping up in Australia. The institution recently collaborated with Western Sydney University on a state-of-the-art vegetable glasshouse, and provided input into the University of Tasmania's Hort Masterclass.

CASE STUDY – AGRICULTURE AND HORTICULTURE DEVELOPMENT BOARD (AHDB)

Hort Innovation funds leading R&D on behalf of Australia's horticultural sector, investing $2.26 million into R&D for the nursery industry in 2017-18 on areas such as biosecurity preparedness, career development and green infrastructure.

RMCG looked at its counterpart in the UK, AHDB Horticulture, which is investing in similar areas and, more recently, the use of robotics to help address workforce challenges such as staff attraction and retention.

AHDB has a program called SmartHort which is aimed at reducing reliance on humans to grow production horticulture. This is particularly pertinent for the UK industry, as Brexit continues to play out and access to labour becomes harder.

For instance, a robotic project is underway to benefit small to medium scale businesses, aimed at automating repetitive tasks such as taking and inserting cuttings, grading and collating pant specimens, as well as minimising plant damage".

This technology could be a game-changer for Australia's nursery industry, which also faces challenges around access to labour, particularly as demand for green life increases, and people are moving away from agricultural jobs.

WHAT SHOULD INDUSTRY DO?

A RD&E Roadmap was developed to guide industry on what RD&E should focus on in the future, how it should be done and who with.

Read Section 4 (The Future) of the full report to find out more but in brief we recommend:

- Developing a program approach to drive projects focussed on addressing the key priorities outlined above.
- Engaging a program coordinator to facilitate the strategic commissioning of research where required, promote linkages between sectors of the industry and RD&E community and ensure that the research program, communications and extension are coordinated.
- Ensuring that research conducted previously over the last ten years both in Australia and internationally is not repeated and outcomes are delivered to industry via an extension program rather than conducting further research. This is particularly relevant for the key focus areas of:
    - Reducing the environmental footprint through improved resource use efficiency
    - Improving production and process efficiencies (both in the field and within protected cropping systems).
- Continuing to identify knowledge gaps and commission targeted research projects to address these gaps. Where possible include international collaborators to leverage off activity occurring elsewhere.
- Developing ongoing relationships/linkages with key R&D providers nationally and internationally identified during this review to enable collaboration on future R&D projects.
- Building connections between R&D providers, technology developers and industry. Activities could include regular R&D forums open to all industry members where researchers provide updates on recent projects and new technologies including those developed by commercial companies are featured.
- Tailoring extension delivery according to the type of producer targeted.

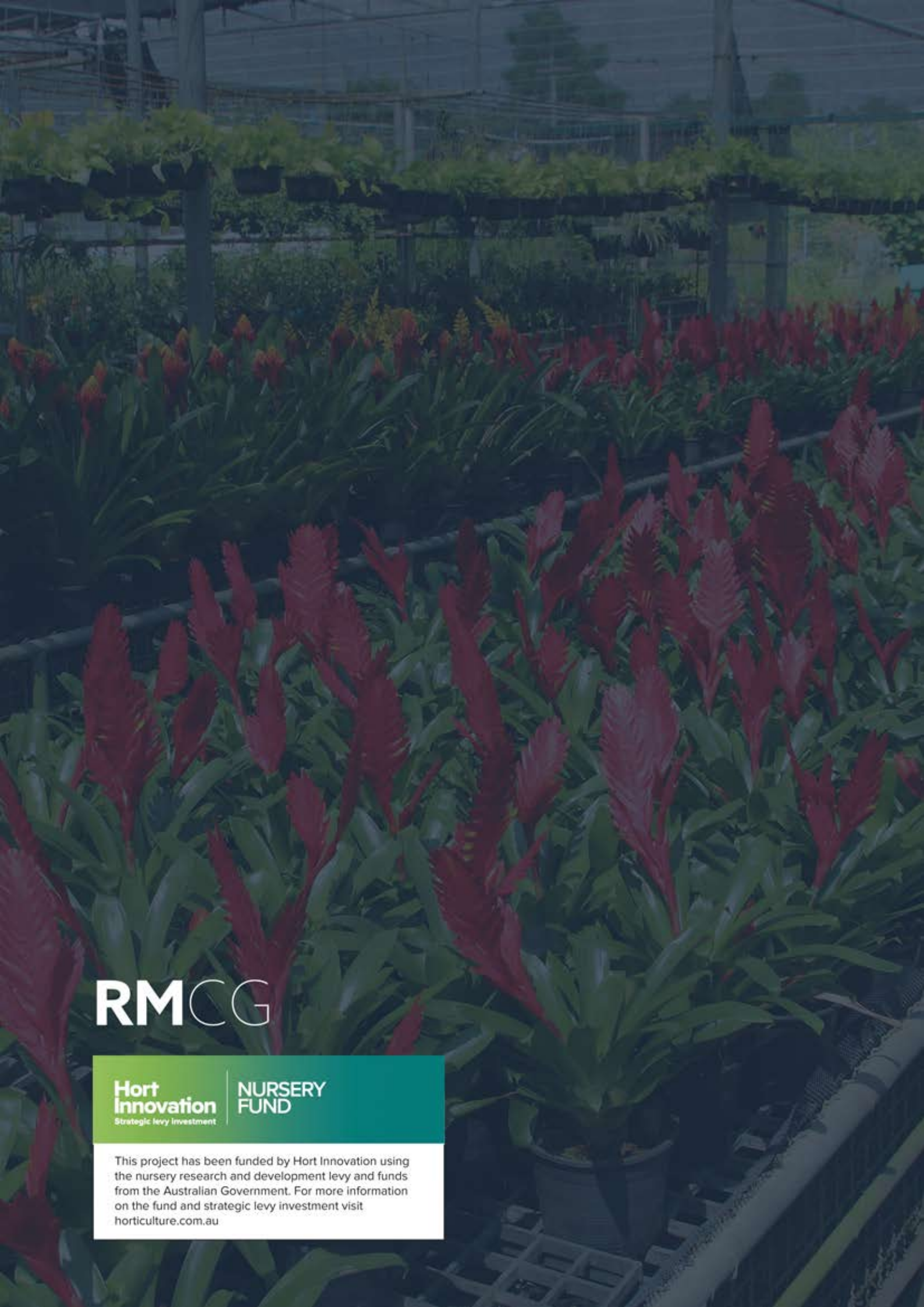
"THE NURSERY INDUSTRY IS DYNAMIC BUT HIGHLY DIVERSE. AS WE'RE DEALING WITH MANY DIFFERENT PRODUCTS AND MARKETS, IT'S IMPORTANT TO NOTE THAT RESEARCH ISN'T A ONE-SIZE-FITS-ALL, BUT A VEHICLE TO FIND NEW SOLUTIONS FOR THE BENEFIT OF ALL OF INDUSTRY."

THE SPECIFIC ACTIONS REQUIRED TO REALISE THE FIVE GOALS OF THE AUSTRALIAN NURSERY RD&E ROADMAP ARE OUTLINED BELOW:

GOAL	TIMELINE	APPROACH	PRODUCER TYPE	ACTIONS
Improve production efficiencies (both in the field and within protected cropping systems)	Outcomes achieved in the short to medium term	Development Extension	Steady and progressive producers	• Ensure outputs and outcomes of previous R&D (conducted over last 10 years) on best management practices for field and protected cropping nursery systems are made available to industry members in an effective extension program to foster adoption. • The extension program should link with, and leverage, the NIASA program within the Nursery Production FMS and also work with those outside this program. • Extract readily useable information from previous research and develop into material to be used within the existing communications program (Cox Inall and NGIA). • Identify knowledge gaps and commission new RD&E projects to address these. Where possible build on and collaborate with research currently conducted by organisations such Wageningen in the Netherlands, German and Californian providers. Projects must have a smart extension component. • Develop ongoing relationship/linkage with the protected cropping sector through organisations such as PCA to build industry capacity and skills associated with protected nursery production systems.
Reduce the environmental footprint of green infrastructure and plant production through better managed input/ output usage (resource use efficiency)	Outcomes achieved in the short to medium term	Development Extension	Steady, progressive and advancing producers	• Ensure outputs and outcomes of previous R&D (conducted over last 10 years) on resource use efficiency is made available to industry members in an effective extension program to foster adoption. • Build on the wealth of international R&D conducted on resource use efficiency particularly in Northern Europe (Germany and the Netherlands). • Identify knowledge gaps and commission new research projects to address these. Where possible include international collaborators such as WUR in the Netherlands, universities in Germany and in the US. • Extract readily useable information from previous research and develop into communication and extension resources to be used within existing communications program (Cox Inall and NGIA). • Develop an extesnion program that improves resource use efficiencies within nursery production systems. Program to link and leverage the NIASA program within the Nursery Production FMS and also work with those outside this program.

NURSERY RD&E ROADMAP ACTIONS

GOAL	TIMELINE	APPROACH	PRODUCER	ACTIONS
Improve understanding by industry of end-user needs/desires	Outcomes achieved in the medium term	Research (market and consumer) Development Extension	Progressive and advancing producers	• Conduct consumer and market based research to better understand consumer trends and future purchasing habits/trends in Australia. • Engage with researchers based in the US (Michigan State University, Purdue University and Texas A&M University) to understand and build on the research and extension conducted there on consumers and markets • Build linkages between producers and their customer (retailers and consumers) so that understanding and expectations are shared. This could include activities such as industry forums where attendance by all sectors of industry are encouraged to discuss recent consumer research outcomes and build networks. Forums should also include presentations by specialists in consumer and market analysis.
Improve supply chain efficiencies and logistics	Outcomes achieved in the medium to long term	Research (new supply chain dynamics) Development Extension	Progressive and advancing producers	• Implement previous research funded by the nursery industry e.g. via planning workshops on process flows and logistics. • Identify (research) any changes in supply chains and issues around those that occurred in the past 10 years and ensure outcomes are provided to industry in a usable format – not just as a report. • Connect with organisations such as the Produce Marketing Association A-NZ (PMA-ANZ) to increase capacity through attendance at supply chain management courses and awareness of new technology/ practices in this area.
Reduce production costs through automation and uptake of new technology	Outcomes achieved in the long term	Research (agri-tech) Development Extension	Advancing producers	• Review technology currently available in Australia and internationally for its suitability for adaptation to Australian conditions. The review should include technology available in other industries (not just nursery) and provide practical recommendations. • Where existing technology is not currently available, scope industry needs, and work with a commercial provider to develop technology that facilitates automation. Ensure that provider is focussed on industry ready outcomes rather than further research. • Link with other industry projects that are currently investigating agri-technology and automation and seek to build on this work. Current project examples include the Developing Agri-Tech solutions for the Australian apple industry led by SwarmFarm Robotics and The National Tree project delivered by UNE and project partners. There are also relevant data capturing/monitoring and data analytics projects and opportunities to be explored. • Work specifically with advancing producers to identify needs and champion new technology as it is likely that only larger and corporate types of business will be able to afford to integrate this type of technology into their businesses. • Facilitate adoption by using advancing producers as examples through the development of case studies and demonstration sites.



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Hort Innovation
Strategic levy investment

NURSERY FUND

This project has been funded by Hort Innovation using the nursery research and development levy and funds from the Australian Government. For more information on the fund and strategic levy investment visit horticulture.com.au