



NEW HORIZONS IN AUSTRALIAN HORTICULTURE:

looking to the
Netherlands for
innovations in high-tech
horticulture for Australian
industry.

An International Specialised Skills Institute Fellowship.

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Table of Contents

i. Executive Summary	3	5. Acknowledgements	19
Fellowship impact	3	Awarding Body – International Specialised Skills Institute (ISS Institute)	19
Summary of key recommendations	3	Fellowship Sponsor - Agribusiness	20
Future impact	4		
1. Fellowship Background	5	6. Appendices	21
Fellowship context	5	Fellowship itinerary	21
Fellow's Biography	8		
2. Fellowship Learnings	9		
Productivity Increases and value adding; using international best technologies and practices	9		
Investigating smarter ways of working together	13		
3. Personal, Professional and Sectoral Impact	15		
4. Recommendations and Considerations	16		
Supporting increased government and private sector investment	16		
Developing a more cooperative approach to industry capacity building and R&D	17		

i. Executive Summary

This Fellowship focussed on international horticulture development best practices in the Netherlands and ways to adopt these in Australia. In particular, the Fellowship investigates lessons from the Netherlands approach to horticulture Research and Development (R&D) and subsequent recommendations for the Australian horticulture industry as well as innovative models for cooperation between growers and supply chain businesses which have underpinned the success of the Netherlands in becoming the leading horticulture country in the world.

The Fellow, Jordan Brooke-Barnett, is Chief Executive Officer of South Australian horticultural industry association AUSVEG SA. Jordan has been CEO since the association's inception and has grown AUSVEG SA into one of the best resourced and influential advocacy groups in South Australian agriculture. The key objective of this Fellowship was to identify industry development opportunities for the Fellow to progress in his professional role in influencing policy and program outcomes for South Australian growers.

Fellowship impact

This Fellowship had a significant professional and sectoral impact for the Fellow, with key findings and recommendations shaping ongoing work advocating for growers, including work with the South Australian Government to develop a model for a revitalised horticultural university course and research capability in South Australia and development of a horticultural centre of excellence proposal for industry. As such, this Fellowship has had an immediate impact in shaping these industry discussions and in ensuring that Australian horticulture learns from and adopts international best practice from the Netherlands as part of these initiatives.

Summary of key recommendations

A number of key recommendations are presented as part of this report and is included as a summary below.

Recommendation 1: That governments and R&D Corporations like Hort Innovation look for opportunities to leverage international research to reduce duplication and improve value for money. If is

Recommendation 2: That a formal outreach program with Dutch experts such as industry associations, Topsector, Wageningen is developed in order to replicate research programmes and facilities in Australia.

Recommendation 3: Avoid duplication with Netherlands technologies and instead cooperate to bring the best available technologies to be applied in Australia.

Recommendation 4: Australian Universities need to foster stronger collaboration with Wageningen University to determine how to develop better courses and research programmes to underpin horticulture development.

Recommendation 5: Develop and deliver an inbound technology adoption strategy for South Australian horticulture. Follow up with resourcing to facilitate linkages between growers and international technology providers and to support companies looking at market entry in Australia work through issues including after sales service, marketing and other aspects of product support.

Future impact

The Fellow is currently working within their strong industry and government networks to progress findings of this Fellowship and turn recommendations into strong outcomes for industry. The Fellow is actively engaged in discussions with state government staff and universities in South Australia around how to better build educational and R&D capability to support the growth of the state's \$1 billion horticulture industry. The Fellow has already presented key findings of this report with senior government and university leaders and will actively work with them over the coming year to develop further industry support initiatives.

This report will also be made available to industry through AUSVEG SA's industry networks.

1. Fellowship Background

This Fellowship had the aim of investigating international horticulture best practices in the Netherlands and investigating ways to apply these in the Australian context. The Fellow travelled to the Netherlands and undertook a week of meetings and site visits assisted by the Kingdom of the Netherlands government in order to identify initiatives which could be applied to the Australian horticulture industry.

Fellowship context

The Netherlands is the second largest agricultural producing country in the world, second only to the USA, with the majority of produce exported to mainland Europe. The Netherlands exports \$85 billion euros worth of agricultural produce and is the global leader in horticultural production.

The Netherlands is the global leader in high-tech horticulture as well as seed and genetics for horticultural produce. The Australian horticulture industry often looks to the Netherlands for innovations in horticulture growing practices, although there has never been a coordinated effort to investigate the breadth of these opportunities and work to methodically introduce technologies in Australia. As part of this project the Fellow conducted a comprehensive investigation of horticulture technologies in the Netherlands with a view to assessing opportunities and developing a range of recommendations to increase uptake of technology in Australia.

The Fellowship investigated the following key areas:

1. Productivity Increases and value adding; using international best technologies and practices

The Netherlands is a global leader in the field of high-tech glasshouse production. Much of Australia's protected cropping horticulture production only uses what is described as 'mid tech' production using basic hydroponic equipment and plastic houses. In addition, the Netherlands is a global leader in on-farm produce processing and value-adding before market. There are enormous opportunities for Australia to embrace a breadth of new technologies such as irrigation control, pack house automation and high-tech glass production among other options. At present, these technologies lack market representation and support in Australia, so a key facet of this research project will be to identify the best available technologies overseas and communicate these opportunities to Australian industry. In addition, the Fellow examined the needs of these companies with a view to working in partnership with the Netherlands Embassy to develop a cooperative model to introduce these technologies to Australia.



Rijk Zwaan headquarters in De Lier

2. Investigating smarter ways of working together

The Netherlands has been a leader in promoting a model of cooperative investment and R&D development between growers. As part of this project the Fellow visited Wageningen University and a number of grower 'food clusters' and cooperatives to examine opportunities for a group like AUSVEG SA to coordinate similar ventures in Australia.

Why the research is needed

The Australian vegetable industry and horticulture more broadly needs to investigate the three areas highlighted above to stay competitive into the future. The following section provides an assessment of key challenges facing our industry and why this Fellowship research is critical to our industry.

Increasing productivity in a highly-competitive environment

With tightening margins and rising costs of doing business, Australia's horticulture growers are in a constant arms race to increase productivity. Whereas much of the gains in the past have come through yield improvements and agronomic expertise, it is expected that the new wave of improvements will be driven by technology and efficiency in areas such as transitioning to high-tech glass production and pack house efficiencies. Australia is a small market internationally, so has limited access to the technologies horticulture will need to grow into the future. As such there is a clear need to assess these technologies and make them accessible to the Australian horticulture industry in a coordinated manner utilising industry and government organisations.

Working together on common challenges

Australian horticulture is a highly-competitive industry with destructive pricing and marketing practices. Some say this is due to the supermarket duopoly which pits growers against each other but, whether this is the case there is a competitive and destructive culture of competition between growers in Australia which does

not seem to be a feature in the Netherlands. In Australia, growers have a tendency to compete heavily on price, often through aggressive discounting to take market share. This has led to a race to the bottom and created deflationary pressure on farm gate prices. Again, this is not the case in the Netherlands, where there are a number of 'food clusters' and other cooperative models where growers work together to trial new R&D, secure investment and market their produce. Often these models involve cooperation between growers and government authorities. The Fellowship research investigated the benefits of these models and their applicability to Australia.



New varieties of greenhouse crops on display at Rijk Zwaan's facility in De Lier

Fellowship methodology and timeframe

The Fellowship research consisted of a number of meetings held with leaders in the Netherlands Horticulture industry between Monday 7 to Friday 11 May, 2018. These included key government officials, industry groups, growers, supply chain companies, R&D institutions, universities and large financial institutions. A specialised itinerary was developed in close consultation with the Kingdom of the Netherlands Embassy in Canberra through close working relationships the Fellow had previously established. This assisted the Fellow in identifying the best people and facilities to visit and in obtaining access to high level officials who may otherwise have been inaccessible.

A number of meetings were held with Netherlands industry and government not-for-profits to better understand the role of industry support associations in the Netherlands. It was clear from these meetings that the Netherlands industry has a much stronger culture than Australia in cooperation and co-investment between industry and government.

In addition, a number of industry and academic research institutions were visited including Wageningen University, the World Horti Centre and the Rijk Zwaan innovation display centre. These meetings provided the opportunity to understand the R&D currently being conducted in the Netherlands as well as the unique approach taken to ensure that the Netherlands remains a leader in global horticulture.

Finally visits to growers, commercial companies and value-adding companies provided insight into ways that the Netherlands is leading commercial development and automation in its horticulture sector to overcome increasing labour and input costs as well as production challenges.

In summary, the Fellowship provided a strong grounding in all aspects of the Netherlands horticulture industry and allowed for an in depth investigation into opportunities applicable to Australian horticulture.

A copy of the Fellowship Itinerary and full summary of meetings is included at Attachment 1.

Fellow's Biography

Jordan Brooke-Barnett is Chief Executive Officer of the South Australian vegetable industry association AUSVEG SA. He has led the association since inception and grown the representative body from humble beginnings to a staff of five committed and passionate industry support staff representing the interests of South Australia's \$700 million vegetable sector. AUSVEG SA today is one of the largest and best resourced groups within South Australian agriculture and business in general. In his current role, Jordan advocates on behalf of industry with governments of all levels and has been instrumental in securing results such as \$150 million in new water investment for growers and successfully prevented rises in rates and government fees which would have hampered industry investment if implemented.

Jordan is a passionate advocate for the South Australian horticultural industry and in his current role has overseen the roll out of a number of R&D and business capability building programs such as export development and innovation training programs to benefit industry.

In previous roles, Jordan has been a speech writer and in public relations roles in Canberra working with government and at Parliament house. He has also held a role as National Public Affairs Manager for national vegetable industry association AUSVEG and holds a Masters in Marketing from Monash University.



AUSVEG SA CEO Jordan Brooke-Barnett

Jordan pursued this Fellowship as an opportunity to further develop the programs and policy priorities of AUSVEG SA by developing knowledge of international best practice from the Netherlands. As a result, he looks forward to turning the findings and recommendations in this report into actionable initiatives which improve the everyday lives of Australian growers.

2. Fellowship Learnings

This Fellowship was an opportunity for Jordan to conduct a comprehensive investigation into the Netherlands horticulture industry and identify new approaches to industry and R&D development applicable to the Australian context. The Fellowship involved a significant number of key interviews and visits across the Netherlands horticulture supply chain and government and yielded a number of key findings relevant to the Australian industry.

The following section details the key findings and experience garnered from this international research and how this learning will be applied to benefit the Australian Horticulture Industry.

Productivity Increases and value adding; using international best technologies and practices

A key focus of this research project was to look at how the Netherlands promote and commercialise R&D to keep their industry at the leading edge of productivity and also how this was being applied in the value-adding space. As part of the Fellowship, Jordan visited a number of key R&D facilities, as well as industry bodies, growers and supply chain participants to learn about how the Netherlands approach to horticulture development is keeping it at the forefront of the global horticulture industry.

A discussion of key findings around key themes is included below.

Strong commercial and government partnerships and investment in R&D

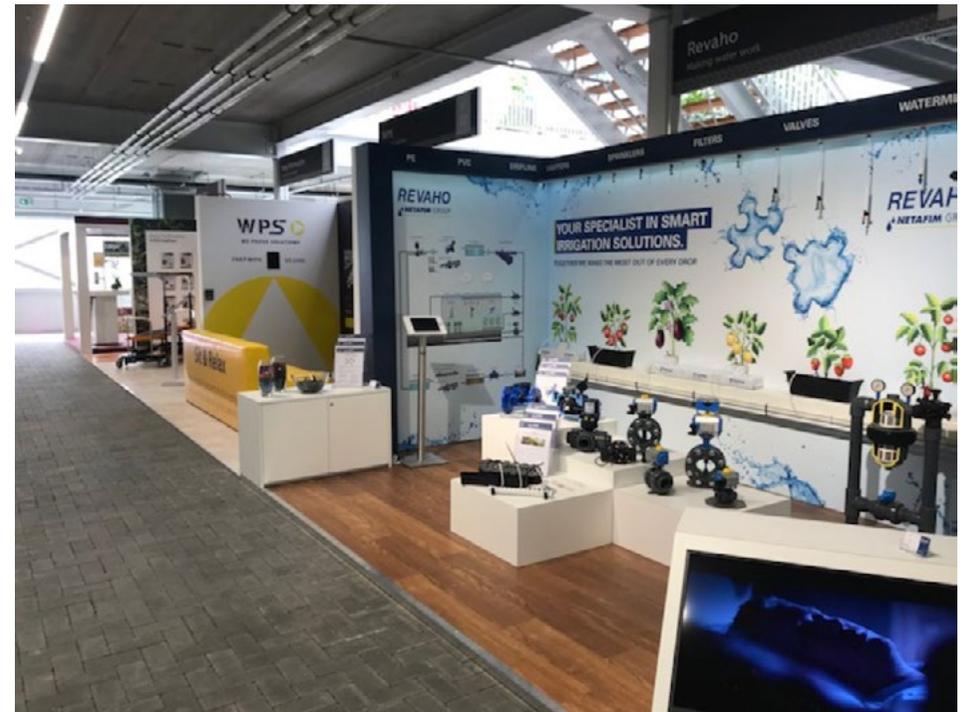
One of the key differences in the Netherlands is that government, supply chain and growers work cooperatively towards big picture R&D goals. In an interview with Loek Hermans, Chair of Topsector Horticulture, a government/industry partnership to further R&D outcomes in the Netherlands industry it was explained that the horticulture industry had identified \$200 million in private sector, government and industry investment to further develop the country's horticulture industry. It was noted that of this \$200 million that 60% was private industry funding which is much higher than companies in Australia typically would allocate towards cooperative R&D. Much of the R&D in Australian horticulture occurs in isolation at the farm or supply chain company level with companies vying for competitive advantage. Much of the broad research is therefore conducted via government or mandatory levies. It is interesting that in the Netherlands there is a much stronger cooperative approach to R&D and much more significant contribution by the private sector, however, it is unlikely that this would be possible in Australia without significant work due to the current prevailing competitive culture and tension between firms. Research was also finely tuned towards five key strategic pillars including focus areas such as yield increases, automation and waste minimisation. Industry has also set a number of top level strategic goals such as eliminating all use of pesticides by 2030, using less water per square metre while increasing yields and tonnage per square metre. It is this ambitious forward thinking vision which sets the Netherlands apart from Australia where producers and R&D has tended to be more focussed on dealing with reactive problems. It should be noted, however,

that R&D organisations such as Hort Innovation are starting to forge strategic alliances with the Netherlands and are starting to adopt this approach to R&D here in Australia.

Inside the commercial display facilities at the World Horti Centre in Naaldwijk

The top level support given to Horticulture was also impressive. The Topsector board included the Netherlands Minister for Agriculture, leading entrepreneurs (what the Dutch call their growers), retailers and the head of Wageningen University. No similar structure exists in Australia to drive priorities in a similar manner, with Horticulture often falling behind in the political pecking order behind other traditional commodities like Livestock and Grain despite being the fastest growing sector within Agriculture.

This is in stark contrast to Australia which does not have a tradition of co-contribution from the private sector in R&D. While there are national R&D levies in place for horticulture, these are much smaller in scale (the vegetable levy is approximately \$16 million per annum) and not matched by private investment by supply chain companies. There are opportunities for Australia to refine its approach to R&D investment by looking to opportunities to further engage private investment and companies to contribute to its research program.



Educational facilities at the World Horti Centre in Naaldwijk

It should be noted that despite the fact that Australia is currently lagging behind the Netherlands, there are high level efforts to improve Australia's international engagement. Previous Assistant Minister for Agriculture and Water Resources Senator the Hon. Anne Ruston has been a leader in establishing greater linkages with the Netherlands horticulture industry and through her oversight of Hort Innovation has driven a number of connections between our respective industries and research communities. Rural Development Corporation for the Horticulture Industry Hort Innovation has also conducted a number of delegations and is engaging in cooperative work which is expected to grow in the future.

Investment in capability and research

Australia has seen a much-publicised deterioration in our R&D capacity at the state government level. There are critical shortages in horticulture in positions such as plant pathologists and other research specialists due to budget cuts and a lack of interest in the sector with new graduates. At the university level, there has been a longstanding challenge in attracting students to horticultural courses, with South Australian Universities currently lacking a horticultural specialist course despite the industry being worth \$1 billion to the state per annum and facing a significant skills shortage for agronomist and farm management positions which are highly paid and desirable jobs for those with the requisite expertise.

While the Netherlands faces similar issues to Australia in that urban workers do not consider horticulture work to be attractive, there is much more by way of support in research and government infrastructure to support the attraction and retention of students in the field. As part of the Fellowship, Jordan visited Wageningen University, one of the world's preeminent agriculture universities which has approximately 20,000 students per year, 40% of which are international. Wageningen's R&D capability is staggering, with 3,000 of the 6,000 staff at the University conducting contract research projects for industry. This is in stark contrast to Australia, where research capacity at the state government level has been eroded over the years and there are looming shortages of critical research people such as plant pathologists due to the fact many existing staff are reaching

retirement age. Wageningen combines a strong applied education and research focus and has a strong ongoing dialogue with industry to drive research outcomes. The centre piece of its research work in horticulture is the University's strong horticulture robotics facilities which have a number of exciting projects underway including a capsicum harvesting robot, hedge trimming and topiary robot and a fully automated smart greenhouse concept for flower production.

The University also has a number of research centres located out in horticultural regions, some with up to 98 greenhouse research compartments where researchers conduct applied research or use these facilities to deliver industry driven short courses. Some of the research includes covering materials/substrate research, energy saving trials into new heating systems, LED light research sponsored by Phillips, and research into biological pest control methods in greenhouses. The sheer scale and breadth of research is world class and well ahead of what is available in Australia. It was also encouraging to see strong industry partnerships and a contribution towards R&D at a level we don't see in Australia.



Wageningen University in the Netherlands

The Fellow met with Dr. Jouke Campen who leads an international team at the University dedicated to developing greenhouse projects all over the world. At the time of the interview, the University had around 90 active projects all over the world in areas such as Africa, Asia and the Middle East. On discussion, Dr Campen and the University would potentially make a good research partner for Universities and research institutions in Australia to share their knowledge and approach of working with industry and supply chain rather than a silo approach.

In addition to a world-leading research capability, the Netherlands also has a well developed supply chain industry of seed companies and greenhouse manufacturers which are world leading in protected cropping technology. As part of this Fellowship, the Fellow visited the Rijk Zwaan new variety display centre and seed production facility.

Rijk Zwaan is a great example of how Netherlands horticulture companies are working with supermarkets and growers to commercialise new varieties of horticultural produce. The company is a niche seed company specialising in greenhouse lines in particular. They have a world-leading demonstration greenhouse where growers from all over the world can visit see and taste new varieties for commercialisation all over the world. AUSVEG SA is aware of a number of grower members who have visited the facility and are now commercialising new lines such as snacking tomatoes and cucumbers in Australia. Rijk Zwaan employs 350 people globally and has a turnover of around \$400 million euros per annum. The company maintains a strong focus on R&D with 30% of turnover re-invested in R&D per annum. The majority of new varieties are being designed for high-tech hydroponic (glass) facilities which poses challenges for Australia where the majority of protected cropping is low or mid tech. This means there are potential opportunities to either work with growers to adapt their technology to grow these seed varieties or even for Australian R&D to focus on adapting new varieties to the Australian setting.

The strength of the supply chain in the Netherlands is clearly underpinning and supporting growth of the broader horticulture industry. Rijk Zwaan is only one example of a success story demonstrating how the Netherlands has been able to grow a strong and vibrant supply chain which supports its horticultural growers. As part of this project the Fellow met with Harm Maters, CEO of AVAG, the industry association representing the supply chain and materials sector of the Netherlands. The association represents around 70 companies in the greenhouse technology sector including greenhouse manufacturers, water system manufacturers, heating and cooling system manufacturers and processing and grading manufacturers. A key aspect of the industry has been the strong growth in exports where these companies which used to export around 25% of their products now export over 80%. AVAG is focussed on further growing international business and is looking at potentially setting up a base in South East Asia to further support increasing demand from the Asia-Pacific region. The Association has been involved in developing turnkey greenhouse projects all over the world in places as diverse as Turkey, Kenya and Mexico where growers and government authorities are keen to adopt and demonstrate the latest technologies. Currently, AVAG is working in over 100 countries but needs stronger sales/service representation in isolated markets such as Australia. Currently there are individual consultants representing 10 or so companies in Australia, but the effort is not as coordinated or significant as it should be in the eyes of Harm. Harm identified that there was a need in Australia for someone to drive a strategy to bring in additional technologies and connect his companies with growers.

Considerations for demonstration and commercial development

As part of this Fellowship the Fellow was fortunate to visit the World Horti Centre in Naaldwijk. The World Horti Centre is an educational and commercial facility which provides short industry driven qualifications at the Certificate level as well as conducting commercial research and acting as a showcase for the Netherlands supply chain companies such as greenhouse manufacturers and seed companies.

The centre was built in 2017 and is based within the horticulture region of Westland and is located close to a number of growers and supply chain companies.

The facility was built with a coordinated investment from government and over 30 companies who now contribute to the ongoing operation of the centre. The centre combines teaching areas able to accommodate a large number of students for short courses and trade qualifications as well as an extensive commercial exhibition area to bring delegations of people from all over the world to view Dutch horticultural technology. Surrounding the learning and commercial facilities are a number of greenhouse research compartments for rent, where companies and government conduct research projects such as seed variety trials. The centre also works closely with universities such as Wageningen to ensure courses are integrated with the tertiary education system. The centre is overseen by a board of directors including industry members and the centre has been an extremely successful enterprise, attracting over 25,000 visitors per annum and educating as many as 1,200 students at a time.

The South Australian Government is currently looking at the feasibility of building a similar facility on the Northern Adelaide Plains so it was a good opportunity for the Fellow to investigate the process of putting the centre together. It was noted in discussion with Jan Enthoven from the World Horti Centre that putting together a facility such as this will be a considerable enterprise involving much work from a board of industry leaders. It was emphasised that there was already significant demand from the commercial and government R&D sector for a facility to be set up to generate commercial outcomes for the Netherlands industry. It is also clear that the relative size of the Australian industry means that it is unlikely we could sustain a facility of this size. On reflection, there is likely to be less demand for a facility of this size in South Australia, due to the less developed supply chain industry and the fact that South Australia is not home to a large export-orientated horticulture supply chain industry such as in the Netherlands. The Fellow had similar discussions with other parties including Topsector Horticulture and Wageningen University, and the Netherlands Potato and Vegetable Associations who reinforced

that a facility like the World Horti Centre was “the cherry on top” to showcase the industry and that a strong foundation of R&D and commercial industry was required to make it work. Growers and horticulture industry professionals from all over the world travel to the Netherlands to learn about the latest developments, therefore, something like an industry demonstration centre is only of value once industry gets the fundamentals right.

The Fellow has used this understanding to further clarify the recommendations made to the South Australian Government. From discussions with industry leaders of the Netherlands the strong recommendation is that the South Australian government make R&D and educational improvements the focus of any proposed centre of excellence over commercial research and showcasing of technologies.

Investigating smarter ways of working together

In Australia, horticulture is extremely competitive with individual growers competing with each other for survival. Much of this culture is set by the Australian retail setting where the powerful supermarkets have put downward pressure on farmgate prices and margins for the growers. Over the last decades the price of large numbers of horticultural commodities haven't kept pace with CPI, despite the fact that farm inputs such as labour and energy have risen significantly in recent years. Australian growers face an ongoing struggle to stay profitable and do this by investing heavily in efficiencies through scale, technology and specialisation growing certain lines. The fact that we have seen significant consolidation in the number of growers has made this situation worse, with growers typically seeing one another as adversaries and unwilling to share knowledge and co-invest on a large scale.



Meeting between Jordan Brooke-Barnett (R) and Ad Klaassen (L), CEO of the Dutch Produce Association

In the Netherlands there is a different mentality, with growers and businesses more open to share knowledge and resources to meet common goals. A number of people seemed to indicate that this was part of the Dutch national psyche, due to the fact that for hundreds of years people have had to work together to maintain the network of dykes keeping the seawater at bay for much of the country. Talking to the many growers and industry people, this was one of the most startling differences compared to Australia where firms, R&D institutions and growers all tended to see themselves as individual actors and in many cases adversaries for funding or market share. Throughout this Fellowship it was astonishing how open Universities such as Wageningen were to the idea of sharing knowledge and intellectual property with the Fellow and Australian counterparts. The Fellow also made a number of valuable connections with the Netherlands Potato Association and Dutch Produce Association which will be used to facilitate greater collaboration between Australia and the Netherlands on strategic projects such as the proposed South Australian Horticulture Centre of Excellence.

As part of the Fellowship, Jordan visited a large grower cooperative called FruitMasters, which has 400 member growers and produces, packs and markets over 220 million kilos of produce each year. The company has grown through investment from growers and now employs over 500 people at its centralised packhouse which handles all of the produce from the nearby community. This enterprise is of a significantly larger scale of cooperatives that have been set up in Australia, however, shows what is possible in the international context.



Meeting between Jordan Brooke-Barnett (L) and Dick Hylkema (R), CEO of the Netherlands Potato Association

3. Personal, Professional and Sectoral Impact

This Fellowship was a highly valuable experience for Jordan in his capacity as Chief Executive Officer of AUSVEG SA. It provided new insight into international best practices in horticulture which can be easily adapted into the industry development and advocacy work conducted in South Australia by AUSVEG SA. In addition, fellowship findings will also be distributed nationally through industry communications networks and national policy discussions.

Key learnings will be particularly pertinent to ongoing discussions with the State Government around opportunities to develop an industry centre of excellence concept and improve R&D and educational support to the industry in South Australia.

The opportunity to see firsthand how the Netherlands industry approaches their work was inspirational, especially due to the fact that the industry in Australia is very adversarial and competitive. The way industry and government work together to deliver transformational and big budget research programmes and initiatives is something for the Australian industry to strive for.

The Fellow has a particular opportunity to apply key findings through their role as an industry leader. AUSVEG SA regularly meets with government to develop new programs and R&D priorities for the industry and is already putting key findings of this Fellowship into action.

In the coming months the Fellow plans to make the following sectoral contributions with findings from this research:

- » Utilise key findings to shape development of a concept for a South Australian Horticultural Centre of Excellence concept.
- » Promote cross country collaboration between the University of Adelaide and University of Wageningen in development of a new horticulture course.
- » Work with university and government researchers to scope and deliver a landmark research consortium around automation and labour saving technology in South Australia.
- » Widely communicate findings of the Fellowship in ongoing capacity as Chief Executive Officer of AUSVEG SA.
- » Communicate findings nationally through industry networks and in discussions with national R&D investment professionals.

On a professional level the Fellowship has been extremely beneficial as it has offered a unique opportunity to conduct a detailed study into the World-leading Netherlands horticulture industry. It has offered the opportunity for the Fellow to develop networks internationally which are advantageous in their current role as well as an understanding of how to adapt the findings to their role as an industry advocate.

4. Recommendations and Considerations

As the result of the Fellow's investigations into the Netherlands Horticulture industry the following recommendations are proposed.

Supporting increased government and private sector investment

While the Netherlands horticultural industry is much larger in scale than Australia, it is clear that a more cooperative approach to R&D investment would benefit our domestic industry. The Netherlands growers and supply chain have a significant cultural focus on R&D and invest a significant amount of turnover (in some cases 40%) back into R&D programs. There are also some examples of significant projects which are being managed and delivered with government, private sector and grower funds. There are opportunities for Australia to adopt a similar approach within our R&D development system using some of the recommendations below.

Recommendation 1: That governments and R&D Corporations like Hort Innovation look for opportunities to leverage international research to reduce duplication and improve value for money.

Recommendation 2: That a formal outreach program with Dutch experts such as industry associations, Topsector, Wageningen is developed in order to replicate research programmes and facilities in Australia.

It should be noted that the Rural R&D Corporation for Horticulture, Hort Innovation Australia, has recently started to explore commercial and international linkages and adopt a similar approach to the Netherlands. This has yielded strong results in projects such as the Western Sydney University National Vegetable Protected

Cropping Centre and the SitPlus Sterile Fruit Fly Facility which both involved strong private/public consortiums to develop. The Fellow recommends that this approach continue and be strengthened to keep delivering on these large scale transformational projects for industry.

There are significant opportunities to leverage international research, such as the robotics work conducted at Wageningen University for the benefit of Australian industry. The Fellow strongly advises government and research investment organisations to continue to look outside of Australia and bring in the best expertise.

Recommendation 3: Avoid duplication with Netherlands technologies and instead cooperate to bring the best available technologies to be applied in Australia.

As Australia is a small market for horticultural supply chain products globally, there are opportunities for us to develop international cooperative networks with countries such as the Netherlands and, rather than just focusing on developing completely new intellectual property, instead become world leading adopters and adapters of technology. This is the basis of discussions the Fellow is now having with South Australian Universities around how best to take some of the international research in areas such as packhouse automation and robotics and apply them in the Australian context. To achieve this, both universities and other research institutions will need to change their cultural mindset from seeking to develop completely new technology to adapting existing technology to commercial applications. This is best illustrated in the field of agricultural robotics, where much of the technology has been developed in theory, but not applied to specific industry issues such as picking crops to minimise low skilled labour or backwards

integration of new technologies into existing packhouse lines.

Developing a more cooperative approach to industry capacity building and R&D

It is clear that the Netherlands adopts a much more coordinated and cooperative mindset to R&D and industry development than Australia. In Australia much of horticulture has a hyper competitive commercial landscape with a culture of fighting for market share which is set by the two big supermarkets. While this mentality is hard to change at the grower level, there are significant opportunities for industry groups like AUSVEG SA, government and researchers to better coordinate the support provided to industry to ensure that the Australian horticulture industry is supported by the best available international research and commercial support.

The following recommendations are proposed to improve the way Australian horticulture engages internationally at the industry level. This is a first step in ensuring a more internationally focussed and competitive horticultural sector in the state.

Recommendation 4: Australian Universities need to foster stronger collaboration with Wageningen University to determine how to develop better courses and research programmes to underpin horticulture development.

Despite horticulture being a \$1 billion industry at the farmgate in South Australia alone, the state lacks a full time specialist horticulture course at the University level. There are similar issues in other states where a lack of graduates is causing significant skills shortages for positions such as farm managers and field agronomists. Industry estimates that this skills shortage is causing a significant productivity loss across Australian horticulture and agriculture more generally.



Netherlands potato producer Henk Scheele from s-Gravendeel, who processes and markets his own potatoes as value-added chips.

Reforms to skilled migration visas have severely hampered the ability to source skilled workers from overseas or for international students to transition to permanent residency. This is a looming crisis for horticulture and agriculture meaning that we need to reinvest in the university sector to grow our skills capability. A key recommendation of this report is that the Australian University sector immediately reaches out to the Netherlands horticulture universities and training bodies to quickly adopt and adapt course curriculum necessary to prepare for this looming

skills shortage. Australia is well behind the Netherlands, so this preparation will be essential for when Australia has to rely on the University sector to provide higher numbers of graduates to support horticulture across Australia.

Recommendation 5: Develop and deliver an inbound technology adoption strategy for Australian horticulture. Follow up with resourcing to facilitate linkages between growers and international technology providers and to support companies looking at market entry in Australia work through issues like after sales service, marketing and other aspects of product support.

From discussions with Netherlands companies it was clear that in many cases they did not know how to approach the Australian market. As a small market globally for protected cropping products in many cases Australia does not justify a significant investment and is often left to gate keepers such as product resellers and consultants on the ground. The issue with this approach is that it severely hampers the breadth of technologies available to local industry due to trade relationships and incentives meaning a company might only carry a select range of technology. Larger growers regularly conduct overseas factfinding trips to identify the latest field, greenhouse and seed technologies however. after sales service remains challenging. As much of the technology deployed in Australian horticulture comes from Europe, often maintenance and servicing staff need to be flown out from overseas. Until now this was a manageable issue for larger businesses, however, with recent reforms to the skilled migration visas often these people are being rejected for work visas. It is therefore a clear strategic imperative for the Australian horticulture industry to better support these companies to develop networks in Australia.

The Fellow proposes that a strategy for inbound technology market entry and after sales service be developed and a facilitator role be identified to assist these companies to expand their networks in our market. The role would ideally be based within an industry body such as AUSVEG SA and engage with state government inbound investment teams to help facilitate market entry and work through

practical issues such as after sales service. The role would ideally involve initial seed funding through government, but move to a commercial service provider model with companies utilising the service on a commercial basis. A key facet of the role would be to identify opportunities for greater cooperation between companies and cost sharing in areas such as after sales service and marketing. The goal of this program would be to work to overcome some of the barriers to market entry which are preventing global horticultural companies from investing in the Australian market and to better support these companies in market.



Automated trolley system at Petra Barendse's Greenhouse in Agriport, Middenmeer

5. Acknowledgements

In particular, the Fellow would like to acknowledge the support of the Kingdom of the Netherlands Embassy in Canberra who were instrumental in developing the itinerary for the Fellowship visits and in setting up a series of high level meetings with the leaders of the Netherlands Horticulture industry. The Fellow was fortunate to have this support as it assisted to identify key leaders and open doors to places they would not have accessed on their own.

In addition, the Fellow would like to thank all of the companies and representatives who kindly gave their time to meet as part of this Fellowship.

Finally, the Fellow would like to thank the AUSVEG SA Board for supporting the Fellow to undertake this fellowship including the resulting time commitments as part of their role.

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Agrifoods Skills Australia was the Industry Skills Council for the Agrifoods Industry covering rural and related industries such as food processing (including beverages, wine and pharmaceuticals), meat, seafood, and racing. The Fellow, and the project team, would like to thank them for providing funding support for this Fellowship.

6. Appendices

Fellowship itinerary

Meeting	Representative	Organisation	Description
Monday 7 May 2018 10:30am	Jan Enthoven	World Horti Centre Europa 1, 2672 ZX Naaldwijk	Industry run innovation centre featuring commercial product displays, teaching facilities and research facilities for field trials.
Monday 7 May 2018 3:00pm	Loek Hermans	Topsector Horticulture Malietoren, Bezuidenhoutseweg 12, 2594 AV Den Haag	Large government led research and industry development consortium with aim of securing \$200 million investment in industry over the next 10 years
Monday 7 May 2018 3:30pm	Dick Hylkema	Netherlands Potato Association Van Stolkweg 31, 2585 JN Den Haag (Scheveningen)	Industry association for the Netherlands Potato industry.
Tuesday 8 May 2018 9:00am	Dr. Jouke Campen	Wageningen University Building 107, Droevendaalsesteeg 4, 6708 PB Wageningen	World's preeminent horticultural university
Tuesday 8 May 2018 1:00pm		Rabobank Headquarters	Leading financial institution funding around 2/3 of Netherlands' Horticultural Industry
Tuesday 8 May 2018 4:00pm	Ad Klaassen	Dutch Produce Association Deilseweg 7, 4191 NX Geldermalsen	Industry association for the Netherlands vegetable industry

Meeting	Representative	Organisation	Description
Wednesday 9 May 2018 8:00am	Jan-Willem Cirkel	Rijk Zwaan Burgemeester Crezéelaan 40, 2678 KX De Lier	Leading Netherlands seed producer with innovative new greenhouse varieties
Wednesday 9 May 2018 3:30pm	Bas Groeneweg	Perfo-Tec Klompemakersweg 16, 3449 JB Woerden	SME specialising in new packaging technology to increase produce shelf-life
Thursday 10 May 2018 10:00am	Petra Barendse	Agriport A7 Flevoweg/Wagenpad, 1775 TK, Middenmeer	One of the largest commercial greenhouses in the Netherlands
Friday 11 May 2018 10:00am	Henk Scheele	Hoekse Hoeve Boendersweg 36, 3295 LB, 's-Gravendeel	A potato producer with a value-added chipping plant.
Friday 11 May 2018 1:00pm	Harm Maters	AVAG (Dutch Greenhouse Technology Association) Maasboulevard 15, 3133 AK Vlaardingen	Industry association for Netherlands greenhouse technology suppliers



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