

SOILLESS AUSTRALIA

Protected Cropping Australia Industry Trade Magazine



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FRONT COVER

The tomato of the future, buying habits, packaging, sustainability and tomatoes for producing drugs were discussed at the recent Global Tomato Congress online. See the full report from page 8. Photo Adobe Stock Photos



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Chair's REPORT

BY NICKY MANN

Welcome to the Winter edition of *Soilless Australia* magazine. I hope this edition finds you well, with enough labour, fair growing conditions and good demand in the market place.

I am not too sure where 2021 is going, but it's definitely flying by. I'm sure most of us are already preparing for the end of the financial year with budgets, planting schedules and more set for the year ahead.

It's been a busy couple months for the PCA Board. Planning is well under way for the next PCA biennial conference, which will be held on October 25-28 in Coffs Harbour in New South Wales. Also on our busy agenda are the University of New England Mapping Project (which you will have read about in Autumn issue of this magazine) and our push for the National Greenhouse Building Construction Code to be made a priority once again.

In April we sent letters to various state and federal ministers and others highlighting the importance of the Code. We've had a strong response from Hon. David Basham MP, Minister for Primary Industries and Regional Development in South Australia, who replied that this is "an issue of significant importance to South Australia's horticulture sector". He has forward my letter to the attention of the Deputy Premier and Minister for Planning and Local Government, the Hon. Vickie Chapman MP, and says that his department will be in contact to seek further information.

In his letter, the Minister also said that he expects to see an expansion of greenhouse and similar developments in South Australia especially in the northern Adelaide plains in response to his state's investment in water infrastructure.

PCA has also been involved in meetings and workshops with various organisations trying to shape future strategies with regards to research, development and extension, where funding priorities should be placed, and lots of on-the-ground work assisting farmers recovering from recent floods and cyclones. Please reach out if you need our help.

For more on our advocacy work see Matthew Plunkett's item on page 30.

Other challenges

Times are very challenging right now with huge and expensive delays on raw materials coming from overseas for the protected cropping sector ranging from glass and plastic to coir, rockwool, piping, steel, fittings and more. Some growers are even reporting that there are rations on various products from suppliers due to the shortages and delays in freight.

Labour is also in exceptionally short supply and some growers are changing their planting schedules, crops or strategies due to this limited resource.

Here at Family Fresh Farms where I work, we have just paid for the quarantine costs for 39 workers from Vanuatu. It has been a huge but necessary investment that has allowed some of our team members to return home to Vanuatu. Some of these people had been in Australia since August 6, 2019 and will be returning to see children they have yet to meet face to face.

Despite the family disruption, for many it has been a life changing opportunity for them that turned one season and air ticket into three seasons of back-to-back work and allowed them to achieve goals they could have only dreamt of before. So there are definitely some silver linings for some from the pandemic.

Youth involvement

Recently we have been involved in a couple of projects to encourage high schoolers and school leavers to consider a career in protected cropping or horticulture as we desperately need to secure a stable and enthusiastic labour force for the future.

If you have a good news story you would like to share of how you are enticing the younger generation onto your farm, especially those from non-farming backgrounds, please get in touch with our wonderful editor Jennifer Stackhouse (at editor@protectedcropping.net.au) so we can share your story and success.

Until next time, keep safe and well and hopefully, I will see you at Hort Connections in Brisbane this month, and at our conference in late October.

Nicky Mann, PCA Chair

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The top five uses for tomatoes are pizza, salad, soup, sandwiches and spaghetti however consumers say they want to learn new tomato dishes. Photo Adobe Stock Photos

Anne Williams said energy sources offered “a lot of room to move” as growers examined alternative heat sources including heat and CO₂ from landfill and heat from tapping geothermal resources. Light sources are also important with a definite trend to LED.

“‘Robotisation’ will happen and will happen faster than we all think,” Anne forecast, drawing a parallel with the introduction and rapid uptake of mobile phone technology.

“And it will help us,” she added but also

forecast that the changes in technology will create the need to produce the right tomatoes for AI and robots.

“Labour is a big challenge for most protected growers,” said Anne, who says we need to get better at everything. The pandemic showed up logistic problems such as getting crops from Spain to consumers in northern Europe. Countries, including Russia, are looking at greater self-sufficiency and more local seasonal production.

“Protected cropping has the ability to grow closer to markets,” she said.

Continuing the focus on sustainability, Céline Montauriol, Sustainability Director at Azura Group in France, presented her company’s journey to reduce their carbon footprint.

She says Azura has calculated its carbon usage and will offset that usage making Azura the first tomato grower to do this. They now include a special logo and QR code on their tomatoes to communicate directly with the shopper who wants to choose a sustainably produced tomato.

Azura measured its environmental performance using life cycle assessments (LCA) carried out in 2010 and 2020. Inputs included emissions on farms and from packaging. While Azura is moving from plastic to cardboard packaging, Céline said 1L more water was used for the production of each cardboard punnet, meaning that “at present there is no clear solution for the industry but that the solution needs to involve all the supply chain”.

SA

Coming up...

The next global fruit congress will be Global Berry Congress Live to be held online on October 21 (check local time); berrycongress.com



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A man with grey hair, wearing a blue t-shirt, is smiling and reaching up to touch a tomato plant in a greenhouse. The greenhouse is filled with rows of tomato plants, some with green and some with red tomatoes. The structure of the greenhouse is visible in the background.

PHILIPS

Horticulture

Grow with the pros

Roelf Schreuder
New Zealand Gourmet

“At Gourmet Mokai we want to grow and sell a sustainable product that stands out in quality, taste, and shelf life. Though we could produce some tomatoes in winter using natural light, we were not able to keep up when customer demand rose. We sought a lighting provider with a lot of experience, and Philips had the most advanced techniques and knowledge to support us. We installed a combination of Philips GreenPower LED toplighting and Philips GreenPower LED interlighting on 4,500 m² of our tomato greenhouses and worked intensively with the Philips plant specialist. We were impressed with the support of Philips on how to get the best out of these lights. **Grow with the pros.**”

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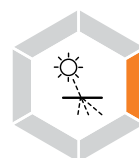
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Currently there are more than 2100 insect species eaten by two billion people from 130 countries. This figure includes 60 native insect species traditionally consumed by First Nations Peoples in Australia. Iconic edible Australian species are witjuti (also known as witchetty) grubs, bogong moths, honey pot ants and green tree ants.

CSIRO entomologist and report co-author, Dr Bryan Lessard, said the report highlighted the importance of supporting and promoting First Nations-led enterprises.

“The roadmap draws on the expertise of Australian and international scientists, Aboriginal and Torres Strait Islander peoples, insect farmers, food processing industry leaders and chefs, to set out the challenges and opportunities presented by one of the world’s richest sources of protein and other micronutrients,” Dr Lessard said. “Australia has a high diversity of native insects.”

He says that by working with First Nations enterprises, many species will have the potential to be sustainably harvested or grown in low impact farms, to be turned into new and delicious Australian foods for us and our pets.

“Commercial insect farming is considered to have a low environmental footprint, requiring minimal feed, water, energy, and land resources – factors of importance to the modern health and ethically-conscious consumer,” he said.

The roadmap also sets out challenges to overcome, including scalability, consumer appetite, and research opportunities, and provides options to tackle them, including new products, innovations to farming and collaboration.

CSIRO has developed the roadmap as part of a broader piece of research investigating alternative protein sources, through its developing Future Protein Mission. It is part of the CSIRO Missions program launched last year. Missions are large-scale research programs aimed at solving some of our greatest challenges, collaboratively with government, academia, industry and community.

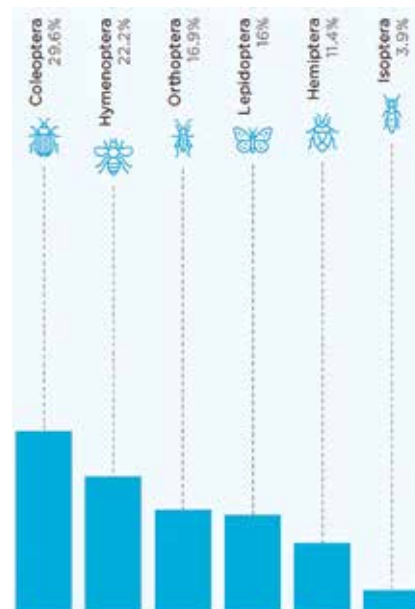
CSIRO’s Future Protein Lead Professor Michelle Colgrave said the mission was focused on helping Australia capture high-growth global protein markets to grow Australia’s protein industry by \$10 billion over five years, in line with the Australian Government’s goal to lift farmgate output to \$100 billion by 2030.

“With the global population set to reach 9.7 billion by 2050, we will need to meet this demand for sustainable protein production by exploring diversified sources,” Professor Colgrave said. “Alternative protein industries can play an important role in Australia, contributing to regional and national prosperity. At CSIRO, we’re researching plant-

Edible insects by region

Number of insect species consumed around the world (right) and percentage of species consumed per insect order (below).

Figure from *Edible insects* report



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Region	Number of species	
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 Tropical Africa	Central and South Africa	470
 Palaearctic	Europe, North Africa and China	294
 Australasian	Australia, New Zealand, PNG and Pacific islands	101
 Nearctic	US and Canada	95

based protein, traditional protein sources, and emerging protein industries including edible insects.”

The roadmap is available in English and Spanish, allowing connections between Australia and Latin America, such as Mexico, where eating insects is more widespread. It provides guidance for Spanish-speaking countries on how to develop their local industries.

COALAR-DFAT Board Member Natalie Collard said edible insect research was highly relevant in today’s world in terms of affordable, accessible and sustainable protein sources.

“It has the potential to provide exciting trade opportunities and could lead to valuable economic outcomes,” Natalie said.

Chair of the Insect Protein Association of Australia, Olympia Yarger, said: “This roadmap provides meaningful steps forward for the guidance of new research and investment priorities that will enable insects to become a more sustainable and high-value part of the modern Australian diet.”

More information

Download a free PDF copy of the *Edible Insects* from: <https://research.csiro.au/edibleinsects/>

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New tomato varieties fight disease

ToBRFV is making tomato growers around the world very nervous but there is good news on the horizon as tomato breeders identify resistant genes and bring new varieties to market.

Viruses are hard to combat and, if they target food plants, can be devastating. Tomato growers around the world are dealing with tomato brown rugose fruit virus (ToBRFV), a highly transmissible disease that emerged seven years ago. The virus damages fruit and reduces yield and is particularly a problem in protected cropping. Although it is not present in Australia, it poses a security risk for the local tomato and capsicum industry.

ToBRFV is a variant of the tobamovirus, which is related to the tobacco mosaic virus and the tomato mosaic virus. Similar to other tobamoviruses, ToBRFV is transmitted mainly by people and equipment coming into contact with plants. It can also be spread more openly by wind or insects and can survive in the soil for years.

Telltale signs of ToBRFV are a mosaic pattern on leaves, narrowing of leaves, yellow spots on the fruit, and necrosis on the stem and other parts of the plant. The virus has forced some growers in affected areas to destroy entire crops. It can also be transmitted to capsicum.



Tomato plant with ToBRFV symptoms on its foliage. Photo courtesy Syngenta

Breeding resistance

Plant breeders have been hard at work trying to develop tomatoes that are resistant to the disease. Last year Enza Zaden announced that they had identified a gene that provides high resistance to ToBRFV.

Speaking at the Global Tomato Congress in March, Kees Könt, Crop Research Director Tomato Breeding at Enza Zaden, said the development of high resistance was vital so that the virus can't enter or propagate in the plant and won't be transmitted to soils.

In early May, tomato seed company TomaTech Ltd, announced they had isolated the DNA markers that elicit resistance to ToBRFV. The company is now filing for a provisional patent for identifying the DNA markers correlated to its resistant traits. TomaTech reports that this will accelerate the breeding and commercialization of high resistance non-GMO tomato varieties.

Syngenta is also working on ToBRFV resistance and has announced the development of two resistant tomato varieties for commercial cropping. The first, a beefsteak variety called Lansor, was released in December 2020.



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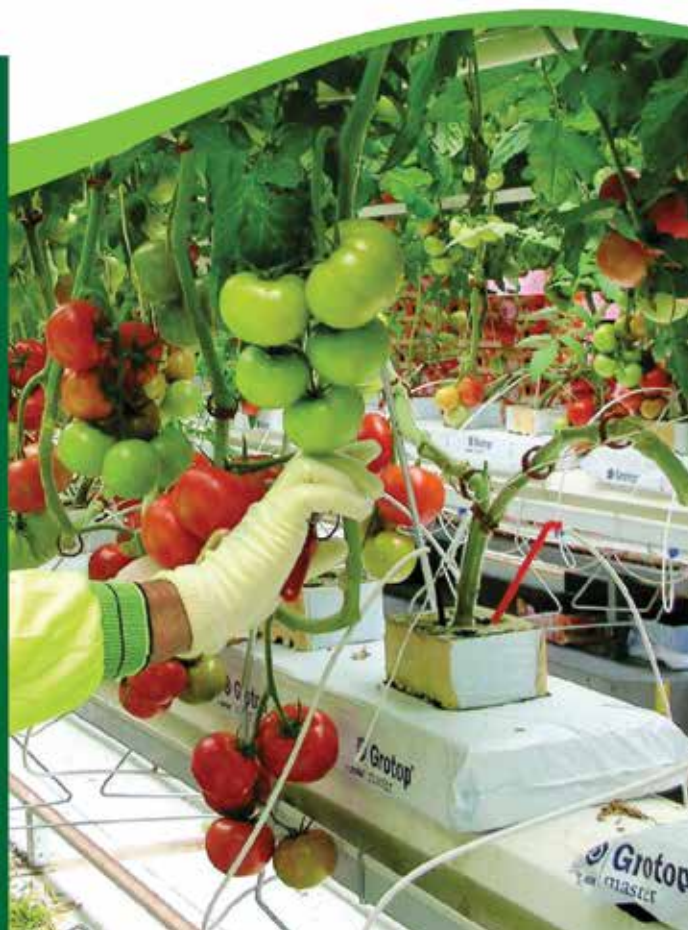
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It is already being grown in the Middle East and some Mediterranean countries, which have been hard hit by the virus.

The other resistant variety, Barosor, will be released this year for the northern hemisphere summer. Syngenta has been working to develop the new varieties in conjunction with Zeraim Gedrea working in a glasshouse in Israel.

Syngenta reports that the speed with which they've been able to develop resistant strains is down to identifying sources of resistance among existing seed lines, which has cut development time from 10 years to just three years.

Syngenta researchers analysed genotypic and phenotypic data drawn from the company's germplasm to identify the genetic regions involved in the resistance. That led to the development of a set of molecular markers that permits the efficient deployment and use of the resistance genes. The long-term goal is develop varieties with high resistance by introducing genes from three resistant sources to their plant-breeding program. The next step for growers is to market the new varieties to consumers.

Good hygiene a key to successful control

As well as looking for resistant varieties, growers are also recommended to take steps to reduce transmission through the use of protected clothing, hand washing and disinfectant, limiting access to greenhouses, avoiding wearing jewellery or carrying mobile phones.



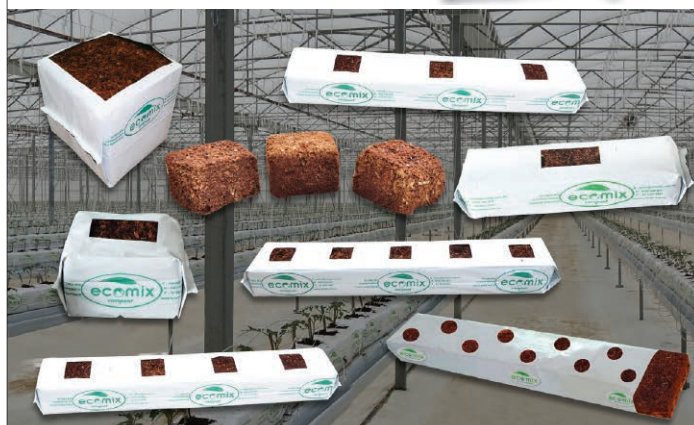
Fumiomi Takeda (left) and Wojciech Janisiewicz with a prototype machine capable of delivering low doses of UV-light to strawberry plants.

Scientists in Kearneysville, West Virginia in the US, are using ultraviolet light to kill pests of strawberry and other fruit crops using a chemical-free solution.

The researchers, Fumiomi Takeda and Wojciech Janisiewicz from the Agricultural Research Service, first developed a stationary apparatus to deliver UV-treatment to potted plants in the laboratory.

To enable growers to use the system, the researchers have designed and built a robotic system that can travel along rows to deliver the treatment to crops in glasshouses and in the field. They say the technology, which they have called PhylloLux, will be available commercially in the next few years.

Fumiomi says the light treatment will kill diseases, insect pests and mites. Only low doses are needed and are applied at night. The low dose doesn't damage strawberry plants. See the PhylloLux system demonstrated on YouTube (<https://www.youtube.com/watch?v=Dm9yLvnENd0>).



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Fall armyworm reaches Tasmania

The prediction made when fall armyworm (FAW) reached northern Australia last year came to pass this May when an adult FAW was found in north west Tasmania.

Biosecurity Tasmania alerted farmers and gardeners that the moth was found in a surveillance pheromone trap near Wynyard on the north west coast.

FAW is a new pest to Australia coming via Africa and Asia from tropical America. It has spread rapidly since it was first detected in far north Queensland in January 2020. In just over 15 months it has spread right across Australia to the west and south reaching Victoria in December 2020 from where it crossed Bass Strait to Tasmania..

Its caterpillar feeds on more than 350 plant species but is particularly damaging to corn feeding on leaves, stems and cobs. It is hard to control and is expected to establish permanent populations in subtropical and tropical Australia. It is unlikely to be more than a casual summer or autumn visitor in Tasmania where winters are too cold for its survival.

Other armyworm pest species are active in Tasmania including southern armyworm and common armyworm, which feed on grasses and other crops. All are striped caterpillars but FAW caterpillars have dark and light banding and an inverted Y-shape on the head. The adult is a brown and white moth.



Fall armyworm caterpillar on corn. Photo Adobe Stock Photos.

Anyone who may have found this pest can have it identified by Biosecurity Tasmania (BT) at no cost. Visit the fall armyworm webpage on the BT website (dipipwe.tas.gov.au) for instructions on how to submit a sample for identification.

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WSU teaching team wins horticulture award

The teaching team at Western Sydney University, led by Prof. Zhonghua Chen, has won an Award of Merit for their contribution to training and education. The award acknowledged new courses offered specifically for the protected cropping industry.

Due to COVID restrictions the presentation of the award was delayed until April 2021 when an event was held at the Ivy Penthouse in Sydney.

Western Sydney University is leading the field in providing a smooth transition from high school and vocation education into higher tertiary education to support the industry's need to fill middle and upper management positions with locally trained talent.

Keeping in the theme of education, the awards also celebrated the efforts of Student of the Year 2020, Lauren Danecek (Certificate III Horticulture) of Ryde College TAFE NSW. The Kim Morris Student Award of Merit 2020 was presented to Brook Toovey (Certificate III Horticulture) of the Canberra Institute of Technology.

The lifetime achievements of Dr Peter Valder were also celebrated. Dr Valder received an award for his service to horticulture, science, media and the community. Dr Valder turned 94 this year. This award was accepted on Dr Valder's behalf by fellow horticulturist and media personality Judy Horton, who left the audience moved by her recounts of his dedication, humour, kindness and exceptional intellect.

An impressive career is also being forged by the Horticulturist of the Year 2020, Clarence Slockee. Through his love for the horticultural industry, its people and the overarching passion to protect country and share knowledge, Clarence has promoted horticulture within the broader community through his work with the Botanical Gardens Trust in Sydney and his television segments on *Gardening Australia* on ABC TV. There was not a dry eye in the awards room as Clarence humbly accepted his award, thanking all those who had mentored him during his career and reminded the audience of the important work still to be done supporting indigenous youth and culture through horticulture and conservation.



The horticulture teaching team from Western Sydney University's Hawkesbury Campus accept an Award of Merit presented by the AIH. Shown left to right: Michael Casey (AIH President), Prof. Zhonghua Chen (WSU), Dr Michelle Mak (WSU), David Randall (WSU), Matt Mitchley (AIH Secretary).

Flavorite merger

Glasshouse grower, the Flavorite Group, announced its merger with the family-owned business Murphy Fresh in March.

In announcing the merger, Flavorite said it will make Flavorite the largest owner-operator of glasshouses in Australia.

Plans are also underway to construct an additional 16.5 hectares of glasshouses in Victoria, including 4.5ha at the Flavorite Warragul site, which will be completed by September this year, and a further 12ha of construction at the newly acquired Tatura site. The new structures will supply glasshouse-grown tomatoes, cucumbers and capsicums to consumers and create a number of new jobs in regional Victoria.



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Solar glass greenhouse opens in WA

The world's first clear solar glass greenhouse has opened at Murdoch University's new grains research precinct at its South Street campus in Perth. Smart building materials company, ClearVue Technologies, constructed the state-of-the-art glasshouse. The structure uses three different versions of transparent solar photovoltaic glazing panels.

The facility will be used by Murdoch University's internationally renowned geneticist, Prof. Chengdao Li, and his team, with a view to developing new plant breeding technologies and integrating them to produce commercial crop varieties.

Murdoch University Vice Chancellor, Prof. Eeva Leinonen said the ClearVue Greenhouse project was a number of years in the making, but represented what universities and industry can achieve when they work together.

"Murdoch's research strategy is focused on food, health and the environment and the inter-connections between each," Prof. Leinonen said. "We also have a long and proud history of building successful community, government and industry-based partnerships and I am delighted that ClearVue has become an important new collaborator as we seek answers to wicked global problems – increased food demand, environmental sustainability and food safety."

Constructed using a \$1.6 million grant from the Australian Federal Government's AusIndustry Cooperative Research Centre Projects program and completed with the assistance of its project partner Edith Cowan University (ECU) and construction partner blanc, the greenhouse utilises clear solar glass that not only lets natural sunlight through but also generates power using the unwanted UV and IR light wavelengths that are converted to power from photovoltaics at the perimeter of the window.

The ClearVue greenhouse incorporates a range of sensors that record and present an array of data in real time providing scientists with accurate information relating to conditions including temperature, humidity and the actual amount of light that plants are receiving.

This information is quickly analysed to make automatic adjustments to air conditioning, lighting, fans, louvres, blinds and reticulation systems, which in turn allows scientists to maintain a constant microclimate that provides optimum growing conditions – all while being powered by the energy generated by the ClearVue glass.

The added benefit to plants growing in the glasshouse is that ClearVue glass blocks harmful UV rays, so the energy required by plants to create a protective layer on leafy vegetables to avoid UV damage can be redirected to growing bigger, tastier, fresher produce, which leads to improved yields and quality of produce.



The clear glazing of this state-of-the-art glasshouse in Perth blocks harmful UV light and generates its own power.

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Last word

with Adrian Hunt

Guest commentator Adrian Hunt is R&D Manager for Crop Production at Hort Innovation. He is based in Victoria.

Protected cropping production systems combine a range of technologies to address climate variability challenges, crop biological constraints and market opportunities in the Australian horticulture industry.

Achieving growth will require coordination and identification of strategic research, development and extension (RD&E) investment priorities that have the potential to substantially benefit industry in the longer term.

To this end, Hort Innovation has funded the development of an RD&E strategy for the protected cropping sector under the project *Australian protected cropping RD&E strategy 2030* (AS19005), delivered by the Queensland Department of Agriculture and Fisheries with support from Food Innovation Australia Limited.

This investment is all about developing a strategy to guide future investment in protected cropping research, development and extension. By identifying and prioritising opportunities for the industry in consultation with key stakeholders, this project will

provide the protected cropping industry with the roadmap to drive growth in the future. RD&E in Australia will need to address specific challenges for growers to adopt new practices and expand their operations.

To develop the strategy, the Queensland Department of Agriculture and Fisheries has consulted widely with the protected cropping industry, and to date around 50 interviews have taken place, involving some 70 industry stakeholders.

The semi-structured interviews with industry participants have included discussion on topics such as:

- What limitations are there to the expansion of protected cropping in Australia?
- Where do you see protected cropping in the future?
- What are the biggest challenges to the sector?
- What do you see as the drivers of change or opportunities for the future?
- What role do you think RD&E can play in contributing to the sector's growth?

Preliminary results have shown that interviewees were passionate about the need for greater investment in protected cropping RD&E in order to drive future industry growth,



Adrian Hunt

as well as improved training opportunities to ensure the sector's workforce are ready to meet current and future needs.

While the interviews confirmed a number of challenges and barriers to future growth that the sector is currently experiencing, there was also consensus about the opportunities to harness protected cropping to drive industry growth. Many highlighted the potential for Australia to fill a global knowledge gap and become recognised as an advanced protected cropping industry expanding to tropical and subtropical regions.

Overall, interviewees outlined an ambitious vision for the future of the protected cropping industry that would see Australia as a world leader in protected cropping over the next decade. A map of the feedback has been developed and is driving the development of protected cropping specific RD&E strategies.

Keep an eye out in industry communication channels for further information on the development of this strategy for the protected cropping sector.



“...INTERVIEWEES OUTLINED AN AMBITIOUS VISION FOR THE FUTURE OF THE PROTECTED CROPPING INDUSTRY THAT WOULD SEE AUSTRALIA AS A WORLD LEADER IN PROTECTED CROPPING OVER THE NEXT DECADE.”

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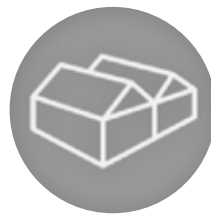
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