

The next wave of high-tech horticultural thinking

By David Thompson and Michael Casey

Australia's horticultural research and development corporation, Hort Innovation, recently announced the formation of a new partnership to advance the state of high-tech urban farming horticulture with partners RMCG, the University of Technology and US-based Agritecture.

The growth of advanced urban food production systems is gaining speed across the world with massive interest in systems that supply high-volume greens in stacked decks with LED lighting, or vertical systems that use hydroponic growing media on walls. In Singapore, Aerofarms has partnered with Singapore Airlines to grow microgreens and salad greens adjacent to the airport for low-mileage catering supplies.

So far, though, much of the interest has centred on edible produce innovation.



Vertical High-tech Farm – Housing Development Board – (Public Housing), Singapore

Hort Innovation CEO Matt Brand said, “Bringing such technology to Australia will attract capital and new entrants to the sector with new ideas, approaches and mindsets. It gives us the opportunity to grow more from less and to keep demonstrating the good work that Australian growers do, day in day out, providing food to families both here and overseas.”

For ornamental horticulture, high-tech production opens up possibilities around new thinking in landscape design and amenity horticulture.

“The opportunity we have in horticulture is to enable people of all interests and backgrounds to apply innovative thinking through horticulture based around their own interests”, says Michael Casey President of the Australian Institute of Horticulture, who has worked extensively in greenwall horticulture and educational gardens.

“For students that love technology, we have the potential to install sensors that quantify plant-related data and use computing technology to visualise plant and crop performance. For students that love media and photography, there are endless ways to showcase the beauty of plants in the urban growing environment. For future chefs, that access to locally-produced, high-quality plant products including not just traditional greens but also edible parts and flowers, can open up innovation and ideas for amazing food experiences in their futures. This is how we can bring new ideas and new people into horticulture”, said Michael.

The convergence of new ideas and advances from overseas into Australia makes horticulture ready for a bright

future. The way we produce food, greens and plant products will continue to be influenced by horticultural technologies, apps and integration with cloud computing.

The Australian Institute of Horticulture is continually scanning for new advances and new ways to prepare our members for a new kind of future.

Case Study: CrowdFarm X (Singapore)

Currently, Singapore produces only a small amount of the food consumed in the country and this produce comes from small farming ventures and community gardens scattered around the small island country. With 90% of the food consumed having to be imported, there is a huge job ahead for the industry and government to ensure that this changes to 30% grown locally by 2030, as stated in the recently released Singapore Green Plan 2030.

So, what do you do when you have a home-grown food shortfall, very small amounts of agricultural grounds to grow produce and companies and staff to service this industry? Well you look to one asset Singapore does have, and that is vertical space with over 2million m² of walls to accommodate growing plants including fresh food.

One such company, CrowdFarmX, has entered the industry and since 2008 is providing some fantastic solutions to this problem. CrowdFarmX aims to enable farms of all sizes to have direct access to the best-practice planting protocols, monitoring and control of their farms to maximise food safety and production. Their cooperative farming platform on blockchain, adopts a people-centric approach to connect farmers in less endowed regions directly to the

global market while providing the right skills and equipment.

Their most recent project is the Vertical Food Stage that constructs vertical farms right next door to Singapore's Housing Development Board (HDB) houses where 85% of the population live. These farms claim to be the first Zero Food Mile farm where seeding, growing, harvesting and retail processes take place right out the front of the housing.

The food is packed on site and then delivered to unmanned retail service lockers where online ordering and robots set aside your order in these unmanned lockers for pick up at a time that suits. These lockers are located at all HDB sites thus reducing the requirement for residents to commute to shopping centres or locations outside of their housing estates.

The farms are built against the building and surrounded by a Perspex style

material which acts as a mini greenhouse using zero energy, and water harvesting on site is powered by solar panels and is completely 'off the grid'. To really top off this innovative project, the growing and managing of the produce is achieved by a digital backbone that uses platforms such as light sensors, micro climate sensors and weather stations to send information data back to the cloud. This information is then powered by artificial intelligence, and the knowledge of agronomists, horticulturists and years of learnt and proven understanding of agriculture, to assist in achieving complete automation and more importantly fresh and healthy food, goes towards improving Singapore's food security.

The beauty of this project, and many like it, is the social inclusion and how the community is embraced in both the growing and managing of these sites through active employment of the young and old alike.

This project is one of the many examples being taken up by organisations around the world to include technology and horticulture, as we endeavour to provide food security and more sustainable measures in greening our cities, and providing a set of guidelines around 'zero food miles' that will surely benefit us all now and into the future.

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