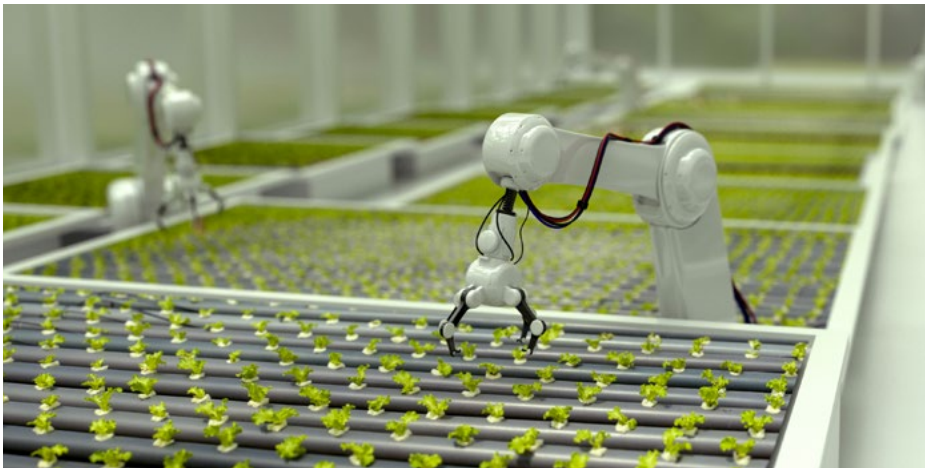
ANSTO's National Science Week HackathOn
16-18 August, 2021

Background brief

Technology in Agriculture Challenge

The production of fresh food is an important part of ensuring people have healthy diets as well as bringing economic benefits to the nation. The horticulture sector (fruit, vegetables, nuts, flowers, turf and nursery products) in Australia operates in a highly competitive domestic and international market, is labour intensive and mostly seasonal. The horticulture industry also contributes significantly to the prosperity of people living in rural and regional Australia. It is estimated to generate $10 billion in gross value each year, producing over 6.7million mega tonnes of fruits, vegetables, and nuts and employing over 70,000 people (ABARES, 2020).

The journey of fresh produce from the farm to your plate starts with growing it, harvesting it, processing and then transporting the food to its final destination. With most farms growing many tonnes of their chosen produce every year, the logistics of getting these products from rural and regional locations into city centres can be tricky.



There are many challenges for food production in Australia. Consider that:

- pest and disease outbreaks mean that food crops can be damaged or destroyed unexpectedly, so supply may be unreliable and costs for consumers may fluctuate
- a changing climate may make traditional methods of food production less viable in many parts of Australia. More severe droughts, floods and temperatures could reduce crop yield or the quality of the produce. Growing food in areas particularly affected by climate change will become more marginal and less economically viable for farmers
- manual harvesting methods are needed for many products because they would be damaged by machine harvesting methods. Harvesting jobs are seasonal and often involve heavy outdoor labour for little pay. Backpackers travelling from overseas make up a significant proportion of this workforce, with the Federal Government's Seasonal Worker Program offering travellers on holiday visas an extended stay if they pick fruit for a period of time in a regional area. This reliance on a short term and transient workforce increases training periods and costs, workplace health and safety risk, and requires higher infrastructure costs to house travelling employees. The COVID pandemic has also meant that travellers are no longer available for this type of work.

Australian Government

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National
Science Week 2021

Food:
Different by design

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- fresh food is perishable and may be easily damaged. Processing and transport that might be time and temperature-sensitive and this can incur extra costs.
- there are increasing inspections and requirements related to food safety, including for disease-causing organisms like Salmonella or E. coli. The strawberry industry was recently sabotaged when a worker hid needles inside fruit in a few punnets, prompting massive recalls of the fruit across Australia. This has huge economic impacts for growers.
- fresh produce is often transported long distances from the farm to the consumer. This incurs costs, produce may be damaged during its journey and increases the carbon footprint of the food production industry.

New technologies can bring about both small and transformational changes to increases in profitability, sustainability and productivity. Many organisations are looking to use big data and Artificial Intelligence (AI) to shift from paper to digital recording that better inform business and supply chain decisions. This may even lead to systems with digital auditing and self-certification of fresh produce. The digitisation of farms also includes smart tools that provide advanced data analytics, increased monitoring with the use of drones, and fertiliser and crop optimisation with farming under laboratory-like conditions.

There is also interesting innovation around making produce more resilient to pests, disease and weed management as well as more sustainable with biofertilisers and farming practices that use vertical farming and the establishment of small-scale agricultural communities.

Resources for students

home.kpmg/au/en/home/insights/2020/07/agrifood-supply-chain-resilience

www.theconsciouschallenge.org/ecologicalfootprintbibleoverview/food-transportation

www.futurefarming.com/Smart-farmers/Articles/2020/10/Challenges-Australian-agriculture-can-be-met-by-new-new-technologies-653275E/

www.agrifutures.com.au/wp-content/uploads/2019/01/18-048.pdf

education.abc.net.au/home#!/media/526919/?id=526919

theconversation.com/agriculture-in-australia-growing-more-than-our-farming-future-22843

www.industry.gov.au/regulations-and-standards/selling-fruit-and-vegetables

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