

Digital Agriculture Strategy

AGRICULTURE VICTORIA

Minister's foreword

The Victorian Government is working to ensure that Victoria's farmers are at the forefront of agriculture's digital revolution. We are doing this by supporting and leading research in agriculture technologies, helping to reduce barriers to widespread technology adoption on-farm, and building digital capability in Victoria's agriculture sector.

This Digital Agriculture Strategy outlines the Victorian Government's plan to support Victorian farmers harness digital technologies to build a more efficient, sustainable and productive agriculture sector in Victoria.

The centrepiece is a \$27 million commitment to support Victorian farmers to adopt digital technologies, including the \$12 million On-farm Internet of Things (IoT) Trial.

As Australia's premier agriculture state and home of innovation, Victoria is well placed to lead agriculture's digital revolution.



The Hon. Jaala Pulford MP

Minister for Agriculture
Minister for Regional Development



What is digital agriculture?

Digital agriculture refers to the use of agriculture technology (AgTech) to integrate agricultural production from the paddock to the consumer. These technologies can provide the agricultural industry with the tools and information to make more informed decisions and improve productivity.



Trends driving digital technology in agriculture

Victoria's farmers contribute one third of Australia's food and fibre exports. Demand for Victorian produced food is set to grow as the world's population increases from 7 billion to almost 10 billion over the next 30 years. A growing global middle class, particularly among our neighbours in Asia, is further bolstering the prospects for food and fibre export growth.

While demand is set to grow, farmers are facing the challenges of a changing climate. Increased temperatures, changes in rainfall patterns, more frequent extreme weather events, and reductions in water availability are already impacting the agriculture sector. In this environment, farmers must continue to innovate to maintain and improve productivity to meet demand.

Digital technologies have the potential to provide farmers with the information and ability to meet these challenges and seize opportunities for growth.

But it is not just about farmers. Consumers both at home and abroad are becoming more informed about the products they buy. They demand high quality and sustainably produced food and fibre, and want to know more about where their products come from. Digital technologies can enable improved traceability of agricultural products, providing peace of mind for consumers and increased value for farmers.



Opportunities

The promise digital agriculture holds for farmers is to provide better information they can use to make more informed decisions to improve farm performance.

Increasing agriculture production

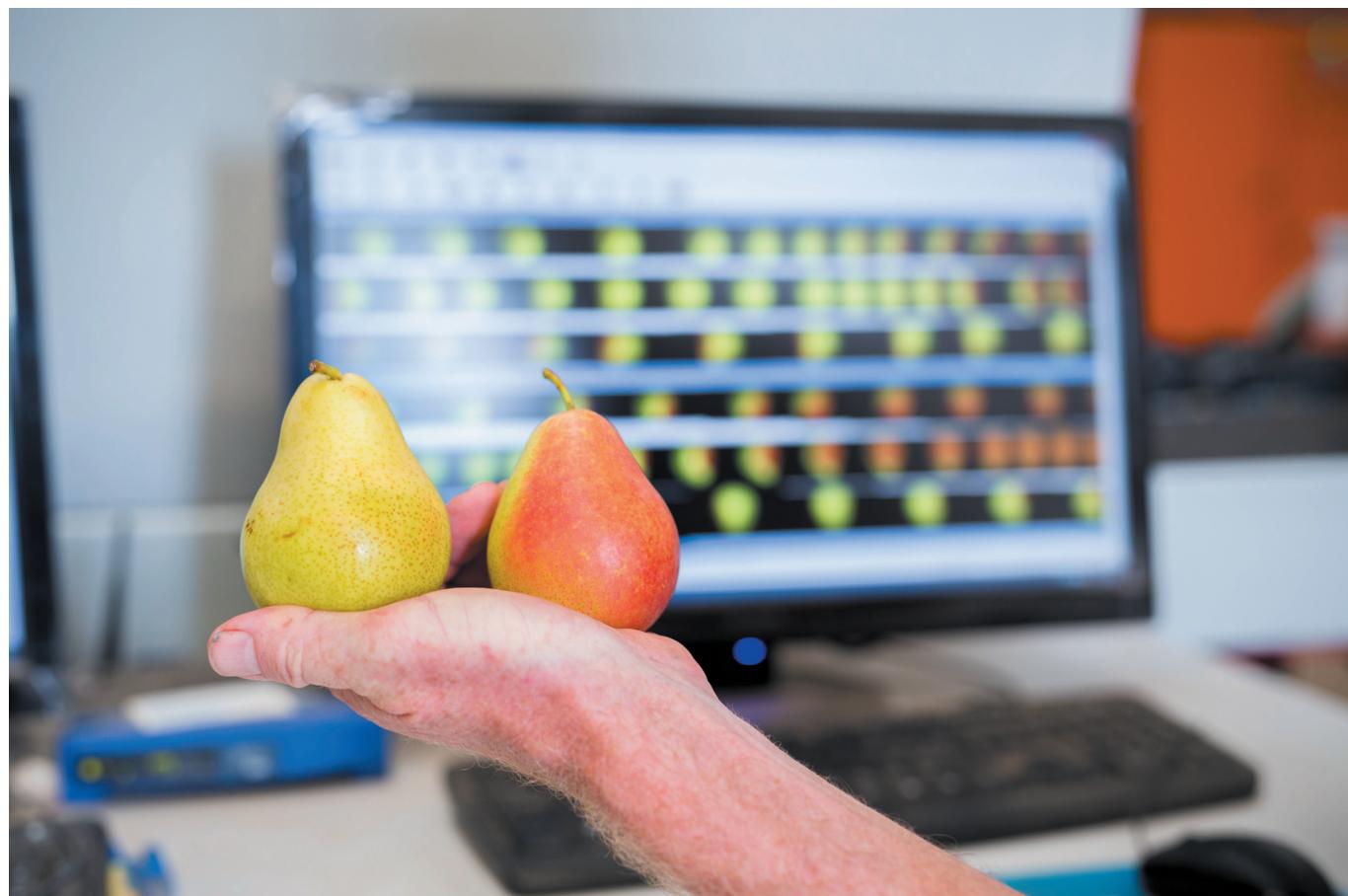
The Australian Government's *Accelerating precision agriculture to decision agriculture* project found that digital agriculture could lift the gross value of agriculture production in Australia by \$20.3 billion, or 25 per cent on 2014-15 levels.

Regional development

Digital agriculture can also support regional communities. Younger generations are keen to work with technology. Through increasing use of digital technology, agriculture can attract and retain younger generations to live and work in regional and rural communities.

Digital agriculture provides an opportunity to create stronger regional and rural communities which are connected through the use of technology. This is a critical enabler for attracting and retaining local populations as well as start ups and other businesses.

A key technology underpinning digital agriculture is sensor technology and the Internet of Things (IoT). Remote sensors can be deployed on farms to collect data on variables such as temperature, rainfall, humidity, wind speed, livestock tracking, and plant and animal health. This information can be relayed to farmers, to save time and cost from manual monitoring, provide greater insight into farm performance and improve farm decision making.



Examples



Robotics are being introduced to the dairy, poultry and beef farming industries. Applications include autonomous feeding and milking, egg collection and sorting, and autonomous cleaning. These technologies are reducing costs while helping early detection and treatment of animal health issues.

Less waste and higher yields are being generated by equipment programmed for variable seeding rates and depths based on soil property and moisture data, derived from satellite imagery.

Digital infra-red light and heat sensors combined with drones are used to measure paddock crop health to inform decisions about irrigation, pest management, fertiliser applications and harvesting.

Integrated digital animal health sensors and electronic identification devices enable farmers to rapidly respond to animal stress or disease, increasing livestock production and improving livestock health.

Barriers

Despite the potential benefits, agriculture is the least digitised industry in Australia. Agriculture Victoria has been talking with farmers and industry leaders to understand the barriers to greater uptake of digital technologies in agriculture.

Key barriers to adoption:

1 Connectivity



Appropriate connectivity is fundamental to digital agriculture with digitised farms needing widespread and reliable coverage.

2 Digital literacy



Many farmers have not had opportunities for practical learning and exposure to technology to identify the right technology options for their farm, or how to reliably use it.

3 Cost and investment rationale



The value of digital agriculture has not been proven to farmers. Demonstration of return on investment is needed to boost adoption rates.

4 Data sharing



There is a lack of confidence in data privacy and security among farmers. Agreed data sharing protocols and governance arrangements are required to encourage the sharing of data across the value chain.

5 Interoperability of data sets



It is currently difficult for farmers to analyse data generated from multiple technologies. The ability to incorporate diverse datasets into a shared platform would allow farmers to gain greater insights and benefits from digital technologies.

Actions

The Victorian Government is committed to driving uptake of digital technology in agriculture. This strategy is underpinned by a series of key actions delivered by Agriculture Victoria to support Victorian farmers.

1 Research and development

Partnering with industry to test new technology and innovations

SmartFarms form part of Agriculture Victoria's 'innovation ecosystem,' which delivers science and technology innovations through a 'hub and spokes' model. The 'hub' is the AgriBio Centre which delivers core capability, knowledge and innovation infrastructure in plant, animal, and microbial systems biology, as well as 'big data' capability.

State-of-the-art SmartFarms create, test, and prove smart technology solutions for agriculture, in partnership with industry, at five major sites: Ellinbank, Horsham, Tatura, Mildura, Hamilton for the dairy, grains, horticulture, and red meat industries. SmartFarms provide a forum to understand on-farm technology integration, and find new applications for AgTech. Testing the impacts of these solutions in a farm environment allows for a better understanding of the return on investment for AgTech solutions.

SmartFarms also provide regional benefits by attracting AgTech businesses and the world's best science across Victoria's agriculture regions. A virtual SmartFarm will connect and display technology across the innovation ecosystem, enabling lessons to be quickly shared between industries.

2 Startup support

Supporting AgTech entrepreneurs

AgTech startups are critical to innovation in agriculture. Startups can deliver new and creative ways of solving problems and improving farm performance. To support the AgTech startup ecosystem, the Victorian Government has invested \$1 million in SproutX: Australia's first AgTech accelerator. SproutX is a \$10 million fund which provides support to AgTech startups, including capital funding, pre-accelerator and accelerator programs, as well as a co-working space. Over 200 startups have been supported to date.



3 On-farm adoption

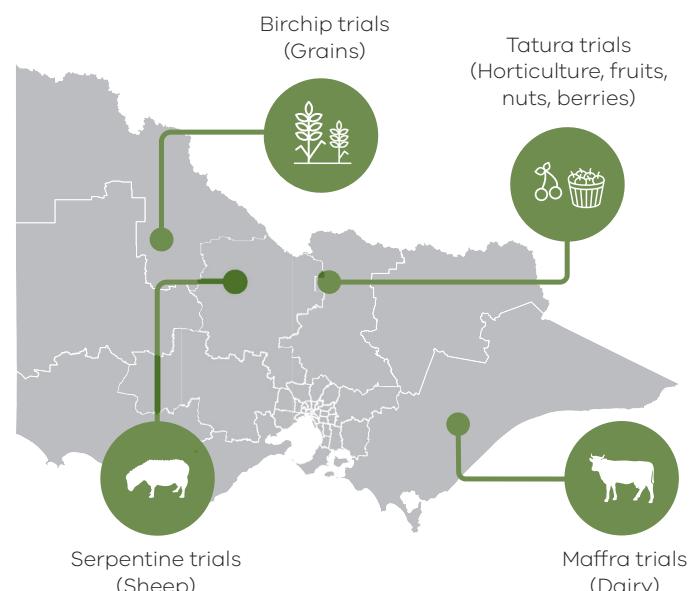
Addressing barriers to farmers using digital technologies

On-farm IoT trial

The Victorian Government's Connecting Victoria program includes a \$12 million On-farm IoT trial. The two-year trial will establish a number of IoT enabled farms across four farm types and regions:

- Dairy (Maffra)
- Horticulture (Tatura)
- Sheep (Serpentine)
- Broadacre cropping (Birchip).

Agriculture Victoria will deliver IoT network connectivity in each of the four regions and will partner with participating farmers to select IoT solutions to trial. The trial will break down barriers such as lack of connectivity, digital literacy and capital to invest. The impact of IoT on farm performance will also be measured and will provide the agriculture sector with a clear rationale for investment in on-farm IoT.



How the trial will work

1. IoT network deployment in each trial region
2. Testing the AgTech market to discover on-farm IoT solutions for each of the four trial farm types.
3. Agriculture Victoria will partner with participating farmers to complete a digital farm plan and select IoT solutions to trial.
4. Agriculture Victoria will assess the impact that the IoT solution has on farm performance and profitability, and publish its findings.

An additional \$15 million has been allocated to support uptake of digital technologies across Victoria's agriculture industries. This program will be informed by the findings of the IoT trial.



4 Skills and education

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Boosting farmer capability

More work needs to be done to demonstrate the value of digital technologies to Victorian farmers. We know our farmers are innovators and we want to make sure they have the skills needed to make the most out of technology.

Formal learning opportunities will help address this need for future farmers. However, there is also a need to upskill those already working in the agriculture sector. This will enable a faster transition toward digital farming practices so that the full benefits of technology can be realised.

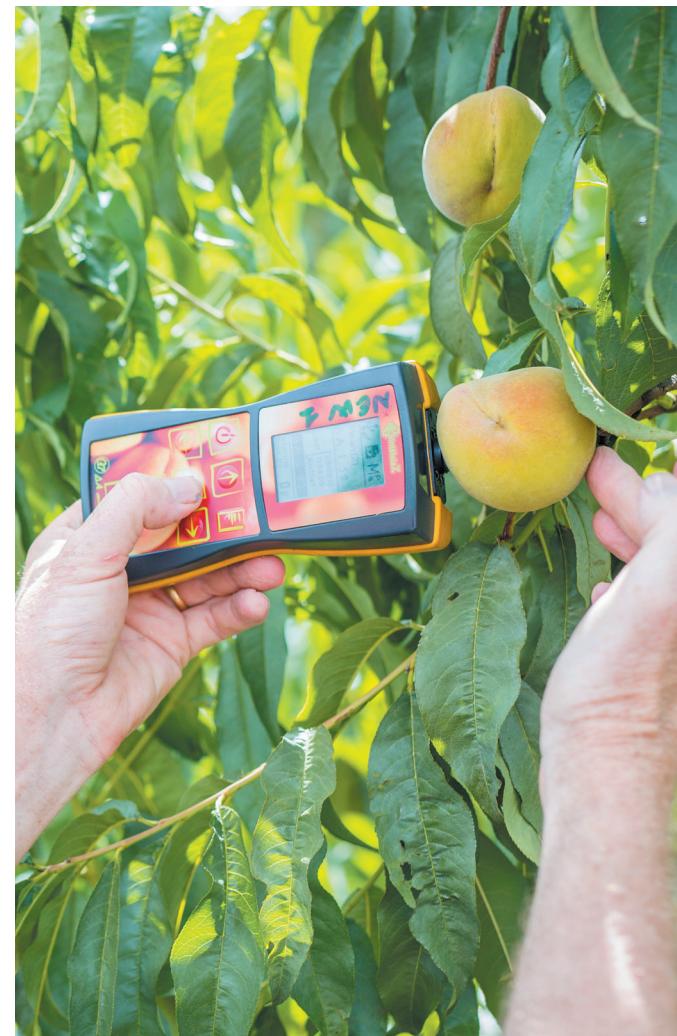
Agriculture Victoria is developing a program to address skills gaps in agriculture, with a focus on enabling the adoption and use of digital technology. This includes linking Agriculture Victoria's SmartFarms with industry to demonstrate the capability of AgTech, and with schools to promote technology-based careers in agriculture.

5 Digital government

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Using technology to streamline government processes and leadership in data management

Government also has a role to play in adopting digital technologies. As part of the On-farm IoT trial, Agriculture Victoria will look to make its agricultural data more readily accessible to researchers and other parties to spur innovation in the sector. Regulatory frameworks need to keep track with innovative farm businesses and processes. Government will actively work with industry and regulators to achieve this. We will also explore opportunities for regulators to use digital technologies to improve regulatory outcomes and reduce red tape for industry.



Case studies



Tatura SmartFarm

Agriculture Victoria's Tatura SmartFarm will highlight and shape future fruit production systems for export markets, demonstrating high-impact agri-bioscience applications to improve productivity.

Innovations include:

- Fruit and tree identification systems to enhance in-orchard phenotyping and pest and disease management, improving data sharing and traceability for international markets;
- Australia's first Sundial experimental orchard to enable full evaluation of interactions between row orientation, tree density and architecture on fruit quality and yield; and
- A smart fruit quality facility, integrated with smart orchards, to enable industry to measure and maintain the quality and value of fruit through production and supply chains, boosting Victoria's ability to meet the exacting quality expectations of the retail sector and consumers.

Silver Orchards

In 2015, Maurice Silverstein decided to upgrade his irrigation system on his apple and pear orchard at Shepparton East to an automated drip system.

This system allows him to access real time soil moisture readings from sensors across the orchard. This system, which also involved a shift from spray to drip irrigation, has resulted in more efficient and less water usage. The system also alerts him to problems in the system, such as blockages or leaks and can be controlled by an app on his phone. He can now respond quicker than relying on field inspections alone.

Maurice says he can pretty much manage his irrigation system from anywhere so long as he has internet coverage. While he needs to be close at hand to fix any problems, he now has greater flexibility in how he manages his orchard. This system has allowed Maurice to be more efficient with his time and water.

Ellinbank SmartFarm

Agriculture Victoria Research (AVR) is working with the dairy industry to grow Victorian jobs and exports through the development and increased adoption of AgTech. The Ellinbank SmartFarm will demonstrate, develop, validate, test and showcase technologies to the dairy industry.

The Ellinbank SmartFarm will incorporate technologies to improve pasture production, allocation and utilisation that will be linked with supplementary feeding systems to improve productivity across the herd. New technologies will be used to improve milk production, calf rearing, animal reproductive performance and animal health and welfare. AVR aims to use new technologies to demonstrate improved whole of life animal performance across the herd.

The Ellinbank SmartFarm has an ambitious target of being the world's first carbon-neutral dairy farm by reducing carbon emissions, improving energy efficiency and generating electricity through a range of alternate options including solar, wind and bio-digestion.

Next steps

The Victorian Government will continue to work with farmers, industry leaders and technology experts to deliver the actions outlined in this strategy.

We are taking action to ensure farmers are set up to succeed, including:

- Connectivity improvements in our four On-farm IoT Trial regions of Maffra; Birchip; Serpentine and Tatura.
- Testing the AgTech market to discover proven IoT applications and devices for our On-farm IoT Trial.
- Regional Industry Technology Coordinators are joining our team to support farmers in trialling and understanding the potential of new technology.
- Farm economists will be engaged to assess the impact of new applications and devices on farm profitability.

To find out more or to get involved, please visit agriculture.vic.gov.au/digitalag.



Authorised and published by Department of Economic Development, Jobs, Transport and Resources, 1 Spring Street, Melbourne. October 2018

ISBN 978-1-76090-007-6 (Print)

ISBN 978-1-76090-008-2 (pdf/online/MS word)

Accessibility

If you would like to receive this publication in an accessible format, such as large print, audio or in another language, please call the Department of Economic Development, Jobs, Transport and Resources on 136 186, email customer.service@ecodev.vic.gov.au or go to www.ecodev.vic.gov.au

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