R&D INSIGHTS

THE LATEST UPDATES ON R&D WITHIN THE OLIVE INDUSTRY | MARCH 2023

R&D Insights contains the latest levy-funded R&D project updates, research findings and related industry resources, which all happen under the Hort Innovation Olive Fund.

Hort Innovation partners with leading service providers to complete a range of R&D projects to ensure the long-term sustainability and profitability of the olive industry.

2023 AOA Processing Workshop moves to SA

The AOA team have planning well underway for another round of industry knowledge-sharing events, run as part of the ongoing olive levy project *Australian olive industry communications and extension program* (OL18000).

Among the first events locked in is the annual Processing Workshop, one of the most in-demand events on the AOA's calendar. Previously held in Boort, Victoria (and online during COVID lockdowns), the workshop is this year being held at Mypolonga, in South Australia's Murraylands region, hosted by award-winning producers Rio Vista Olives.

"It demonstrated that it's not just a case of getting your olives in the machine and turning it on: you really have to investigate your fruit and then work with what you've got."

Big picture learning

Making great EVOO is all about ensuring quality at every stage of the process, so the comprehensive two-day course covers it all - from grove management for optimal fruit quality to best-practice processing and storage. Along the way attendees learn a lot about olive oil chemistry, and get the answers to many of those frustrating "why did/does that happen to my

International production consultant Pablo Canamasas will take attendees through the fruit testing and preparation regime before heading inside for processing trials.

Processing for Rio Vista and other growers, Master Miller Jared Bettio has extensive knowledge of processing machinery and methodology.

oil?" questions, as the focus moves firmly onto the practical aspects of oil extraction.

Expert presenters

Guiding participants through all this information is Pablo Canamasas, international olive oil consultant, processing expert and EVOO judge. He will be joined this year by Rio Vista Olives' Master Miller Jared Bettio, a multi-award-winning olive grower and EVOO producer. Rio Vista also provide contract processing services for growers across the Adelaide Hills and Murraylands regions, so Jared knows a lot about dealing with widely varying batches of fruit.

"The results of the trial show that a few minor adjustments make a huge difference in terms of your output."

Rounding out the presenting team is Rio Vista Marketing Manager Sarah Ascuitto, an AIOA judge and internationally qualified Olive Oil Sommelier. A master of descriptives with a brilliant palate, Sarah will take attendees through a tasting of EVOOs to identify significant characteristics, including common defects.

Their combined wealth of knowledge and practical experience will ensure complex detail presented in a user-friendly format, making this a course for growers and producers at every stage and capacity.

Primed to process

An integral part of the workshop program is the pre-event webinar, which has been recorded and is available on-demand for registrants for viewing prior to the physical course.

Run by Canamasas, the webinar covers a good chunk of the course's theoretical learning, with topics including grove management practices and their impact on quality; determining optimal harvesting times; oil storage and filtration; and a comprehensive look at the parameters determining olive oil quality and shelf life.

Providing an overview of the process prior to the workshop, the webinar allows attendees to get a handle on the science and theory before they experience the practical side.

Packed program

The rest of the program happens at Rio Vista Olives' Mypolonga grove and mill, where Canamasas and Bettio will work through the practices

2023 AOA Processing Workshop

When:

13-14 April 2023

***Pre-event webinar on demand**

Where:

Rio Vista Olives, 262 Carawatha Drive, Mypolonga, SA

Presenters:

International Olive Oil Consultant Pablo Canamasas - Quality, Chemistry, Processing

Rio Vista Olives Master Miller Jared Bettio - Processing

Rio Vista Olives Marketing Manager Sarah Ascuitto - EVOO Tasting/Identifying Defects

Cost:

$275 - AOA members/levy payers

$375 - non-member/processor/ other industry

More information:

www.olivebiz.com.au

What information do YOU want?

Two of the "sell-out" elements of the industry communications and extension project are the national field day programs and the annual production workshops. Both are locked into the continuing five-year program, with some elements confirmed, but the organisers are keen to know what other topics you would like to see covered.

- Field days: what would you like them to focus on? Where should they be held in your state?
- Workshops: currently cover processing of EVOO and table olives. Are you interested in learning about producing flavoured olive oil?

Suggestions for webinar topics, fact sheets and other project outputs are also most welcome.

Please email your feedback to Liz at *secretariat@australianolives.com.au*. And many thanks to those of you who have already sent through your feedback!

AIOA judge and internationally qualified Olive Oil Sommelier Sarah Ascuitto will lead a tasting of EVOOs to identify common defects and characteristics.

and processes from grove to finished product.

Topics covered on Day 1 include fruit preparation; crushing and malaxing; horizontal and vertical centrifugation; impacts on oil quality; extraction efficiency; settling and storage.

"It's a fabulous course and I learned so much. We'll definitely be changing practices from this."

The Day 2 program moves on to hands-on demonstrations of the processing methods and practices discussed the previous day. Fruit will be processed using different paste preparation approaches to evaluate oil extraction efficiency and quality, and the session will finish with a tasting of the oils obtained during the trials and discussion around the results.

A networking dinner on Day 1 is also included, along with lunches and morning/afternoon tea breaks.

Register early

Places for the Processing Workshop are limited and sell out quickly each year, so if you're keen to learn the science and best practice of producing high-quality EVOO, jump online and book your spot NOW! Register via 'Events' on the *OliveBiz* website - *www.olivebiz.com.au*.

Churchill Fellowship applications now open

Applications are now open for the 2023 round of Churchill Fellowships, offering the opportunity to travel overseas and investigate a topic or issue you are passionate about.

Churchill Fellowships are a non-academic award available to Australians from all walks of life, with no formal qualifications required to meet the criteria. Recipients receive fully-funded travel for four to eight weeks, and support from the Winston Churchill Trust, so they can spend time with international leaders in their field of interest, visiting and gleaning insights from abroad, and then bring their newfound knowledge and ideas home to benefit their industry or community.

Horticulture Fellowships

Hort Innovation has joined forces with the Churchill Trust to offer three Fellowships annually, each valued at around $26,000, to drive innovation and transformation within Australia's horticulture industry.

Run under the ongoing project Churchill Fellowships (LP16002), the Fellowships are open to any industry participant with an idea for a research project that can benefit the horticultural sector. The topic of focus is completely up to the applicant, with a diverse range covered by the more than 4600 Fellows involved since the program started in 1965.

Each Fellow designs their own itinerary, however, applicants are expected to have worked through the issue thoroughly in Australia, exhausting locally available knowledge. Importantly, they must also be able to demonstrate the potential benefits to their sector or community, and be willing to share the findings on their return.

The application round closes 1 May 2023 and recipients will be announced in September 2023, for travel in 2024.

For more information and to apply, go to *www.churchilltrust.com.au - Become a Fellow.*

Churchill Fellowships are funded by the Hort Frontiers Leadership Fund, with co-investment from the Winston Churchill Memorial Foundation and contributions from the Australian Government.

Hort trial a shot in the arm for Xylella immunisation

Protection from the olive industry's number one disease risk, *Xylella fastidiosa,* could be on the horizon, thanks to an $8.7M investment by Hort Innovation to trial tree immunisations against the deadly bacteria. The project will also trial immunisation against *Huanglongbing* (HLB), a disease with similarly devastating outcomes for citrus trees.

Sara Bakhshi on Unsplash.

Hort Innovation chief executive Brett Fifield said the project aims to safeguard key Australian horticulture industries by immunising trees with RNA-based technology, similar to coronavirus vaccines for humans. The RNA immunisations cause the tree's cells to produce chemicals targeting the specific pathogens.

Investing in preparedness

"Xylella and HLB are two of the most threatening bacteria in fruit and nut trees worldwide, and if they found their way into Australia, the results would be catastrophic," Fifield said.

"While these threats are not in Australia currently, being ready is crucial. This project is about preparedness, and adds to the more than $60M investment Hort Innovation is delivering in biosecurity measures to support and protect Australia's $15.2B horticulture industries.

"The trial will begin with citrus and table grapes, and we will explore opportunities for this technology in almonds, avocados, olives and summerfruit."

Combining technologies

The trial will be delivered through Hort Innovation and led by US-based agricultural biotechnology company Silvec Biologics, alongside the University of Queensland (UQ). Researchers will employ Silvec Biologics' RNA-based plant immunisation technology, combined with Australian-developed BioClay™ technology to improve the delivery.

"The main challenge for RNA-based technology is not the development of the active ingredient but rather the delivery mechanism," Silvec Biologics president Dr Rafael Simon said.

"BioClay™ protects the double-stranded RNA, enhancing the active ingredient delivery into trees, and has been validated for viruses, insect pests and fungi in multiple crop host systems. We will therefore leverage the locally-developed BioClay™ platform to improve the introduction of our vectors into trees."

US trials ensure Australian biosecurity safety

Hort Innovation Acting Head of Production R&D Vino Rajandran said that, while this is an Australian-led project, the trial will be run off-shore.

"The trials are actually taking place in the US, where the pathogens are already present. There is no Xylella or HLB here, so it's all safe that way," he said.

"The biotech company are working to deliver a 'vaccine' by inoculating the budwood and introducing that into the trees. That will then stay in the tree system and fight the Xylella or other pathogen. And UQ will see if they can use BioClay™ as a system to affectively deliver the vaccine.

"They're also going to test how persistent the vaccine will be; whether it will stay in the plant system and provide ongoing protection. That will happen in California, looking at table grapes and Xylella.

"If the trials are successful, the aim for the future would be to use the BioClay™ delivery for existing orchards, with new orchards established from nursery stock grown from inoculated mother trees.

Olives in scope

Rajandran said that while the initial work is on citrus and grape vines, olive growers will benefit from the project.

"Olive work is being done within the scope of the five-year project," he said.

"By year four we will have at least a preliminary outcome and will be doing some lab-based tests with olives at that point.

"And once the technology is proven and marketable, it will be brought to Australia. We are a prioritised market now because of our investment, so if it does work we'll definitely get access to it."

Industry protection

AOA CEO Michael Southan said the technology would be a game-changer in the case of a local Xylella incursion.

"It's the difference between being able to deal with Xylella if it becomes an established disease in Australia vs the industry disappearing if it did," he said.

The buzz on BioClay™

BioClay™ is an innovative topical protection medium which primes the plant's own defences - in a similar way to how a vaccine works - helping the plant to attack specific crop pests and pathogens naturally.

It was developed through a three-year Hort Innovation multi-industry levy project, *Novel topical vegetable, cotton virus and whitefly protection* (VG16037), with research led by the University of Queensland. Run from 2018 to 2021, the project had a range of co-investors and aimed to minimise the economic impact of pests and diseases in major crops.

Sustainable protection: the issues

The project was grounded on two issues around crop protection:

Firstly, the recognition that resistance, lack of pathogen specificity, residues, run-off into waterways and potential harm to human health and the environment are major issues with current crop protection practices. To this end, there was an obvious need for a new non-GM environmentally-friendly, safe and sustainable crop protection approach.

Secondly, the opportunities presented by RNA interference (RNAi) - and the limitations in its use.

RNAi is a strategy to engineer transgenic crops for the management of viruses, insects, nematodes and fungi.

**Transgenic describes an organism that contains genetic material into which DNA from an unrelated organism has been artificially introduced.*

Topical application or spraying of double-stranded RNA (dsRNA) without the need for genetic modification presents a novel crop protection platform which is almost like 'nature versus nature', where a gene sequence from the pathogen is used to kill the pathogen itself. However, a major obstacle to commercialisation for horticultural use has been the instability of topically applied dsRNA on plants.

The solution

Using clay particles as carriers, the research team developed the BioClay™ technology to deliver pest-targeting RNAi effectors that are stable, do not wash off and provide an extended window of protection. The clay particles naturally degrade on the leaf surface, alleviating any concerns about residues.

Methodology

This project focused on developing the BioClay™ platform to target several major crop viruses and Silverleaf whitefly (SLW).

The two components of the platform, dsRNA and clay, were designed, modified, engineered and synthesised to industry-relevant parameters, including selection and isolation of the genes critical to survival of the viruses and SLW.

Spray application of BioClay™ for viruses was validated through multiple glasshouse and field trials, where it was found to provide protection against the viruses with no adverse effect on plant growth. For SLW, the BioClay™ platform was developed to target all stages of whitefly (eggs, nymphs, and adults), with the spray resulting in significant egg and nymph mortality. It was shown that dsRNA can enter into leaves of different host plants, moves systemically in both directions and is also taken up by whitefly feeding on the treated plants.

The future

While the technology still needs to be validated at scale, the researchers concluded that:

"The Australian-owned and invented non-GM, non-toxic, target specific, easy to adopt and environment, grower, and consumer-friendly BioClay™ platform means clean, green produce for domestic consumption and exports, and preparedness for biosecurity threats."

More information: www.horticulture.com.au.

"It very positive, and is a great example of using technology and research from other areas - in this case medicine - to develop a new technology to protect the Australian tree crop from these diseases.

"But this is a long way off and in the meantime, it's important for the olive industry to observe and promote best practice in biosecurity measures to ensure Xylella doesn't get to us before we can get to it.

"It's not an opportunity to drop our guard: we need to maintain continuing vigilance in terms of biosecurity on our properties."

About Hort Frontiers

This tree immunisation trial is funded by the Hort Frontiers strategic partnership initiative, which facilitates collaborative, cross-industry investments on longer-term and more complex themes identified as critical for Australian horticulture by 2030 and beyond. The aim is to better equip Australian horticulture for the future ahead through innovation and transformational R&D.

Hort Frontiers funds are sourced from a wide range of co-investors, including commercial businesses, research agencies, government departments and education institutions, as well as Australian Government contributions. Levy funds can also be invested if advised by an individual industry's Strategic Investment Advisory Panel.

While the individual goals of co-investment partners may differ, Hort Frontiers projects need to benefit all of horticulture to be considered suitable investments.

2021/22 horticulture statistics now available

The latest edition of the Australian Horticulture Statistics Handbook is now available, providing data across the Australian horticulture industry for the year ending June 2022.

The data shows growth in both horticulture production volumes and values since the Handbook's inception in 2012/13, with an additional 850,000T (tonnes) produced in 2021/22 and the annual value up by $6.15B (billion).

Overall horticulture figures 2021-2022

The horticulture sector overall achieved $15,622.4B in production value in 2021-2022, an increase of 3% from $15,241.1B in 2020-2021. There was mixed performance across the various commodity groups, with the major contributors of value growth being the vegetable and nut categories – which increased 12.9% and 16% respectively.

Total production

Total production across all horticultural products in 2021/22 was 6,545,575T (6,629,506T year ending June 2021). Fruit accounted for well over a third of that figure at 2,551,741T (2,542,439T), with olives at 77,000T (130,000T).

Total value

Total value of all horticultural products in 2021/22 was $15,622.4M ($15,236.6M), with fruit again accounting for more than a third of that amount at $5,521.9M ($5,752.1M).

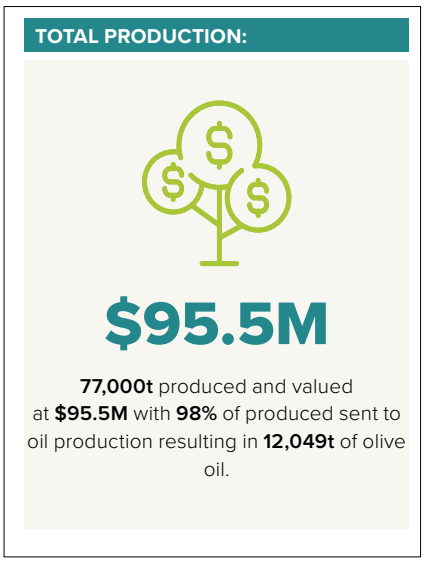
The production value of olives was $95.5m ($161.2M), ranking the industry at 18th (12th) in the fruit category.

Total exports

For the year ending June 2022, Australia exported $2.75B worth of horticultural products ($2.65B), with fresh fruit once again the largest value export grouping at $1,224.8M ($1,216.4M). Processed fruit accounted for $149.8M of the total ($154.7M), including olives and olive oil at $23.1M ($13.5M).

Total imports

For the year ending June 2022, Australia imported $2.84B ($3.03B) worth of horticultural products. Processed fruit was again the largest value import grouping at $1,081M ($1,111.7M), including olives and olive oil valued at $175.7M ($244.2M).



All images, Hort Innovation.

Olives Overview

The handbook covers four industry category sections - *Vegetables, Fruit, Nuts,* and *Other* horticulture. Undoubtedly the most important element of the Fruit section (to us, anyway!) is the Olives Overview, providing a snapshot of the Australian olive industry for the 2021/22 year. Key statistics include:

- state-by-state production for the year has remained stable over recent years, with percentages remaining at: Victoria 69%, South Australia and WA 11% each (WA 10% in 2020/21)) New South Wales 9%, and Queensland and Tasmania both <1% (QLD 1% in 2020/21);
- the production area recorded also remained stable at 21,250 ha;
- annual production decreased by 41%, from the previous year's record 130,000T to 77,000T. This is, however, a substantial increase on the 2019/20 harvest figure of 50,000T (previous 'off-year');
- production value also saw a parallel decrease, down 41% from $M161.2 in 2021/22 to $M55.5 ($M62 in 2019/20);
- around 98% of the fruit crop was extracted for oil, producing 12,049T of olive oil; again, a substantial decrease from 20,678T in 2020/21 but more than 50% higher than the 8,662T produced in 2019/20;
- the remaining fruit was used for table olive production, once again almost all for the domestic market;
- the wholesale value of oil produced was $201.5M, down from $320.6M in 2020/21 and also the $M224 figure in 2019/20;
- consumption of olive oil per capita, based on volume supplied, was 1.25kg, substantially lower than the 2.17kg figure in 2020/21 and also that of the previous two years.

Olive oil international trade

The international trade figures for 2021/22 saw differing outcomes for olive oil exports from and imports to Australia:

- 1,758T of olive oil was exported, down 15% on the 2020/21 figure of 2,061T. This followed the previous downward trend of a 23% reduction in 2019/20 (from 2,681T);
- consequently the value of olive oil exports also decreased, but only by 10%, from $14.2M in 2020/2021 to $M12.8 in 2021/22. This is approximately two-third of the 2019/2020 value figure of $M18.8;
- reversing the previous three-year trend, olive oil imports also decreased, the 2021/22 figure of just 22,165T equating to a 40% reduction on the 37,201T in 2020/21. This is also a significant reduction from the 36,467T imported in 2019/20;
- the value of olive oil imports also saw a 35% decrease, down from $175.8M in 2020/21 to $114.2M in 2021/22 ($178.8M in 2019/20).

Note: no figures or information are provided for table olives.

While the dramatic decline (-40%) in olive oil imports from 2020/21 to 2021/22 is no doubt partially due to the impacts of the COVID-induced global supply chain disruption, we can also hope that this means that Australian olive oil (hence EVOO quality) has filled the gap and many more consumers are now aware of the exceptional quality of locally-produced EVOO.

About the Handbook

Now in its 8th edition, the Handbook is the leading resource for national horticulture statistics and market information. Produced annually by Hort Innovation, it contains the latest production, international trade, processing volumes and fresh market distribution data available, across 75 horticultural categories.

It captures the previous financial year's data, drawn from supply chain sources including international trade statistics and industry peak bodies. It includes information on retail and food service use, exports and imports, share of production by State and Territory, wholesale value, and volume. The information available varies depending on the product and availability of relevant data.

Search online or download

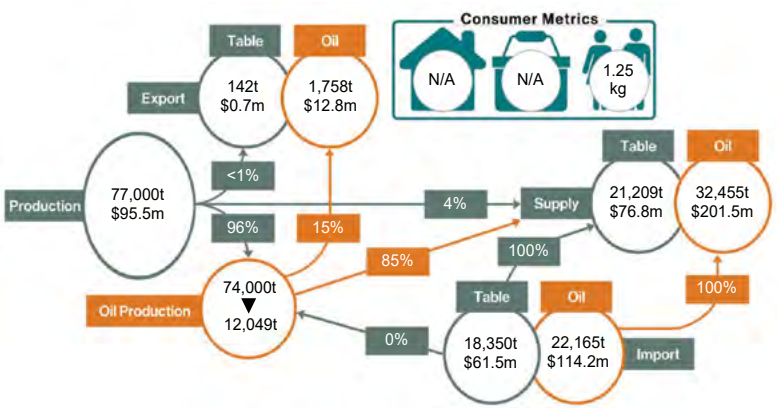
The handbook is published as an interactive online dashboard enabling search functionality, with formats for both computer and mobile phone use. The original handbook format is also available as separate downloadable PDF documents covering five category sections: *Fruit* (including olives), *Vegetables, Nuts, Other Horticulture* and *Trade Analysis*.

Both versions are available at *www.horticulture.com.au/hortstats.*

The Australian Horticulture Statistics Handbook 2021-22 was produced by the across-industry levy investment project *Australian Horticulture Statistics Handbook 2021-22 to 2023-24* (MT21006).

Olives Overview

OLIVE OIL/TABLE OLIVE SUPPLY CHAIN – YEAR ENDING JUNE 2022

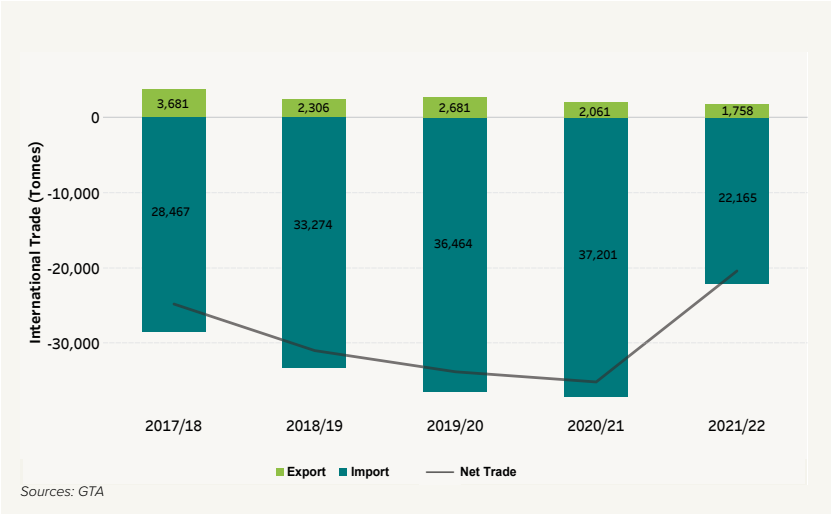


Sources: Australian Olive Association (AOA); GTA; MP & DD (Freshlogic Analysis)

Olive Oil International Trade

OLIVE OIL INTERNATIONAL TRADE

For the year ending June 2022, Australia imported **22,165 tonnes** of olive oil (**this number does not include table olives**). The exports and imports of olive oil over the last five financial years are profiled in the graph below, where imports are counted as negative tonnes.



Sources: GTA

Agri-Climate Outlooks to improve Australian agriculture's climate resilience

Hort Innovation has joined forces with nine other research and development corporations (RDCs) to launch a $19m investment to tackle climate change impacts on agriculture.

Led by Agricultural Innovation Australia, the *Agri-Climate Outlooks* project will build industry understanding and management of short-term climate risks and foster long-term resilience.

The four-year program will enable the Bureau of Meteorology (The Bureau, formerly BOM) to improve and greatly enhance seasonal outlook services provided to Australian producers. The Bureau estimates the initiative could potentially generate up to $68 million in value annually for agriculture.

Collaborative RDC program

Agri-Climate Outlooks is funded through cross-sectoral investment via a collaboration of 10 of Australia's Rural Research and Development Corporations (RDCs): Meat & Livestock Australia, Australian Eggs, Australian Wool Innovation, Dairy Australia, AgriFutures Australia, Grains Research and Development Corporation, Fisheries Research and Development Corporation, Cotton Research and Development Corporation, Sugar Research Australia and Hort Innovation.

AIA CEO Sam Brown described the collaboration as 'ground-breaking' in its structure, seeing RDCs working together on a large-scale project with common goals to help growers and production enterprises mitigate the impacts of climate.

"Climate variability is proving to have a significant and devastating impact on agricultural and food production, as we have seen with recent floods, extreme weather events and the subsequent food shortages and supply chain challenges," he said.

"Growers need the most reliable, accurate and timely seasonal forecasting information to help them manage and adapt to changing climates. This initiative will improve the relevance, trust and ease of use of climate information in their decision-making via a whole-of-sector approach to agricultural innovation."

Specific and dedicated

Agri-Climate Outlooks will develop decision-specific digital forecast tools and products tailored to specific commodities. The program will also support improvements to Australia's dedicated weather forecast modelling system.

"This initiative will involve deep engagement across the industry to identify high-impact weather- and climate-dependent decisions which growers make, and then design fit-for-purpose products and services to support those decisions," The Bureau's General Manager, Agriculture and Water Matthew Coulton said.

"It will also contribute to improving the accuracy of the underlying forecast, which will provide benefit across all growing and production industries now and into the future."

Program workstreams

The Bureau will manage five *Agri-Climate Outlooks* workstreams, between them covering products, services, support and industry capability building:

1. establishment of a dedicated team of agri-climate specialists to provide relevant insights to support growers with climate-related decision-making;

2. upskilling and training for growers and their advisers to accurately interpret and utilise weather, climate and water products to inform agricultural decisions;

3. development of easy to understand, decision-specific forecast products, delivered via appropriate digital channels;

4. development of methods to overlay skill on the Bureau's seasonal outlook products and promote the methods as best practice to other seasonal outlook service providers; and

5. improvements to Australia's high calibre sovereign seasonal forecasting, through improved accuracy of multi-week through to seasonal forecasts. This will help ensure the future stability of the Australian agriculture sector and increase the potential magnitude of benefits delivered via Workstreams 1-4.

These workstreams strategically leverage previous investments made by RDCs and the Australian Government in improving climate and weather capabilities, including the Climate Services for Agriculture platform.

Climate Services for Agriculture

Delivered by CSIRO and the Bureau of Meteorology, the *Climate Services for Agriculture* (CSA) prototype aims to help Australian farmers to adapt to climate variability and related trends, thereby improving the viability of their businesses.

The CSA prototype is unique in that it helps users understand the historical, seasonal and future climate at their specific location, to inform decisions for their business. It provides:

- historical data from 1961-2020;
- seasonal forecasts from 1-3 months; and
- future climate projections to 2030, 2050 and 2070.

Note: the platform is currently in prototype phase. It is being used to deliver relevant data and insights at a national scale and is focussed on eight pilot regions for consultation, evaluation and feedback purposes.

To find out more and access the prototype, go to *www.agriculture.gov.au* and search for Climate Services for Agriculture. : Growing season management checklist

This *R&D Insights* insert has been funded by Hort Innovation using the olive research and development levy and contributions from the Australian Government. Hort Innovation is the grower-owned, not-for-profit research and development corporation for Australian horticulture.

Hort Innovation Strategic levy investment | OLIVE FUND