

MANGO MATTERS

JULY 2019 / VOLUME THIRTY-SIX

THE SUN SETS ON ANOTHER SUCCESSFUL AUSTRALIAN MANGO CONFERENCE

Page 10

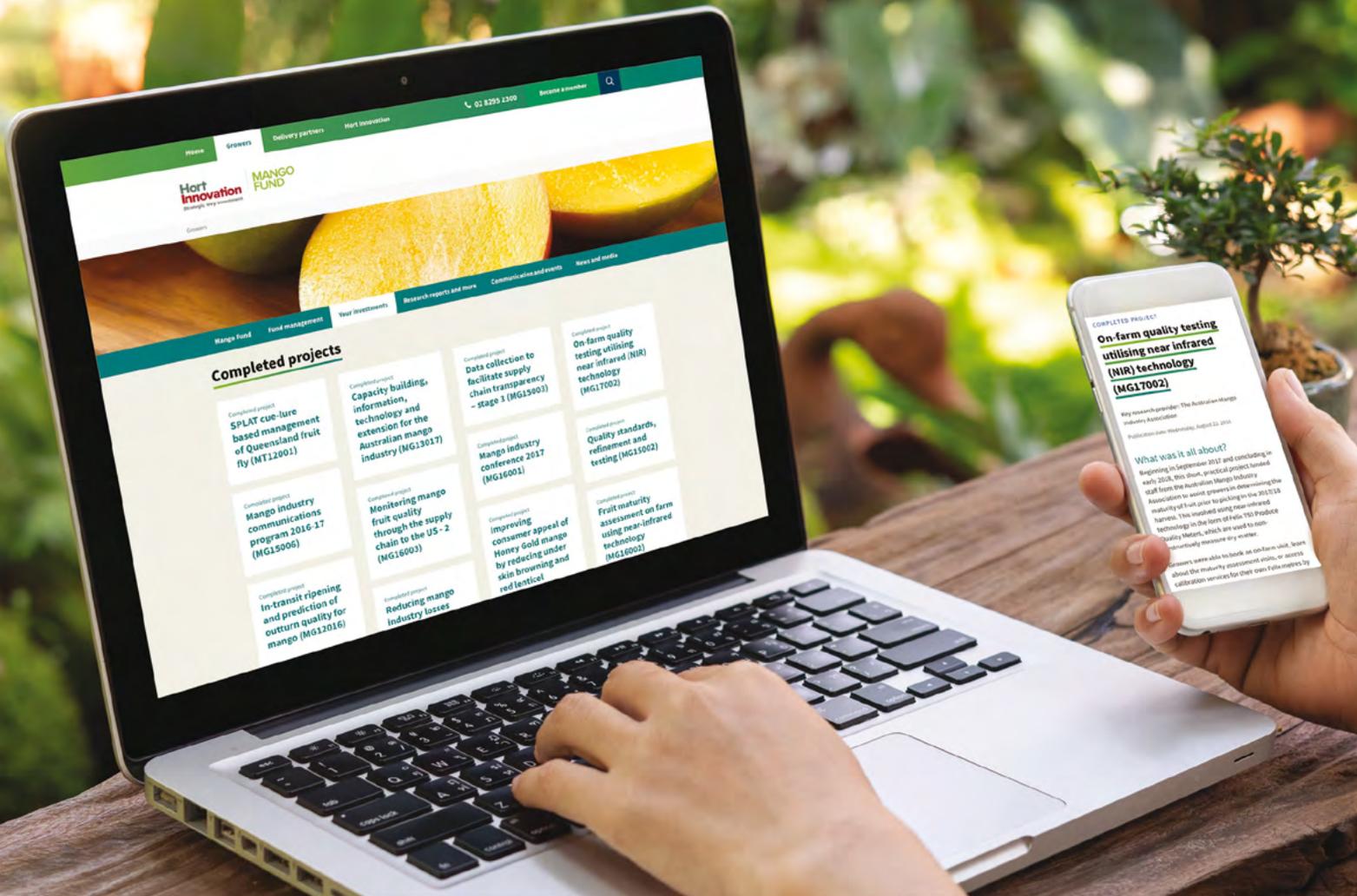
Advances in what we
know about RCD

Page 19

Why understanding climate
change makes cents for the
mango industry

Page 20

WINTER
ISSUE



The Mango Fund has a new website

Hort Innovation's new website allows the mango industry to find more information and more resources quickly and easily.

Six pages of industry-specific content provide you with:

- Up-to-date details on levy fund management
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NEW – completed investments:

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Innovation**
Strategic levy investment

**MANGO
FUND**

horticulture.com.au/mango



Falling in love with mangoes

More households are buying more mangoes, and buying on more occasions, thanks to the well co-ordinated efforts of the Australian Mango Industry.

MORE ON PAGE 14

Australian Mango Industry Association (AMIA) Contact Details

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WANT TO CONTRIBUTE?

If you would like to submit pictures and story ideas to AMIA, or provide feedback, please contact the AMIA team via the details listed on this page.

CEO'S REPORT



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“A highlight for me was the announcement of our focus areas of our best practice management resource; supply chain temperature management, decision to pick, and orchard management.”

- Robert Gray

It was fantastic to see so many of you at the 12th Biennial Australian Mangoes Conference—more than 220 delegates were in attendance. A highlight for me was the announcement of our focus areas of our best practice management resource; supply chain temperature management, decision to pick, and orchard management. The development of this best practice resource is a component of our current mango levy funded Hort Innovation project MG17000 Building Best Management Practice Capacity for the Australian Mango Industry.

The industry will concentrate on building this resource over the next three years. The Australian Mangoes team is excited to be working on this resource, together with the Queensland Department of Agriculture and

Fisheries, Northern Territory Department of Primary Industry and Resources (NTDPIR), Western Australia Department of Primary Industry and Regional Development (WADPIRD), Central Queensland University and NT Farmers.

If you missed the conference, there is a wrap up on page 10.

As we approach the coming mango season, we will be inducting a new Industry Development Manager, following Samantha Frolov's announcement to step down from the position. We thank Sam for her hard work over the past two years and wish her all the best as she pursues another opportunity within the industry. We will announce our new Industry Development Manager shortly.

Following our Annual General Meeting, we will say goodbye to Ray Courtice and Gavin Scurr and welcome John Nardi and Joe Perry to our board.

We look forward to catching up with you shortly at the pre-season roadshows in August. Dates for the roadshows can be found on page 27.

MANGOES MEAN MAGIC IN THE NORTHERN TERRITORY

49% of Australia's mangoes are produced in the NT.*

The NT's integrated, specialist research team are undertaking research of regional, national and international significance.

Find out more at www.dpir.nt.gov.au

* Source: Australian Horticulture Statistics Handbook 2017/18

Department of Primary Industry and Resources



CHAIRMAN'S REPORT



Ben Martin
Chairman, AMIA

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The biennial mango conference in Darwin proved once again to be a great success and I express my appreciation to our sponsors, supporters and staff who collaborated to deliver this informative and enjoyable event. As this is a biennial event, I would urge growers across Australia to work towards supporting the 2021 event as there are benefits to gain by being involved.

As I mentioned in a previous report, the AMIA Board is committed to reviewing the marketing strategies and work on this matter is continuing. The purpose of the review is to ensure we are achieving value and merit from our current marketing strategies and to identify further opportunities.

Another priority is to achieve a review of the market access protocols for international markets. There is a strong indication that in some cases a review incorporating the recent technological advances is warranted. While this will be a long process, we must engage with government to ensure

“Another priority is to achieve a review of the market access protocols for international markets. There is a strong indication that in some cases a review incorporating the recent technological advances is warranted.”

- Ben Martin



Delegates attending the 12th Australian Mango Conference in Darwin.

the significant benefits for our industry are understood and supported.

In this regard, I have recently had a meeting with the Hon. Bridget McKenzie, Deputy Leader of the National Party and Minister for Agriculture and George Christensen MP outlining the need for this review. It was a very productive meeting, with Senator McKenzie displaying a genuine interest on those matters discussed and in addition, a commitment for further contact in coming months.

At a recent meeting, I also discussed the purpose of this review with the Hon. Mark Furner, Minister for Agricultural Industry Development and Fisheries in the Queensland Government. These were

two good opportunities to discuss the long-term sustainability of our industry with government ministers.

The June edition of the AMIA newsletter *The Slice* contains a range of information relating to our industry including employment opportunity for an Industry Development Manager, the Hort Innovation Update and the scheduled dates and locations for the pre-season roadshows—I urge growers to lock these dates into your calendars now.

On a sad note, I must express on behalf of the AMIA Board and staff, our condolences to Robert Gray and family on the recent passing of Robert's mother. Our thoughts and best wishes are passed on.

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DIRECTOR REPORTS

SOUTHERN WESTERN AUSTRALIA



David Morcombe
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I'd like to farewell our outgoing directors Gavin Scurr and Ray Courtice. Gavin has contributed a lot during his time, and we appreciated Ray stepping up when there was an unanticipated vacancy on the board. I look forward to working with the new directors, Joseph Perry and John Nardi.

Winter in the southern areas is a very quiet time for our trees. It is important to keep up a copper spray program over this cold wet and windy time to ensure good quality fruit next year.

The 12th Biennial Australian Mangoes Conference in Darwin was a great success and it was good to see increased attendance from our region this year. If you were not there, the next one will likely be in May 2021, so do not miss that one! With new varieties, trellising trials, robotics and new markets among the topics presented at conference—there is a lot to keep up with in the industry.

In the Gingin region we are coming off a very light season so we can hopefully expect a big season next February / March when most of our crop is harvested. The only way we can move a big crop is to have good quality so that our marketers are happy to push the volume. I hope we will have some of the crop heading to the eastern cities as well. During the coming months we need to prepare for accurate crop forecasting.

Carnarvon is coming off a late season and there has been a lot of pruning taking place partly stimulated by the area wide fruit fly project; so, it is possible Carnarvon may have a lighter crop in the coming season.

NORTHERN TERRITORY & NORTHERN WESTERN AUSTRALIA



Gavin Scurr (outgoing)
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After a very poor wet season growers in the Katherine region are anxious for some cool weather to trigger flowering. Most trees are looking pretty settled and with some cooler weather forecast hopefully flowering will commence.

This will be my last report as a director of AMIA as I stood down at the AGM last month. During the 12 years I've been on the board there have been many changes within the industry. I feel the biggest impact has been because of the renewed focus on fruit maturity. By delivering a better eating experience more often we encourage consumers to buy more mangoes. This increases demand which increases the price they are willing to pay. We can't take our consumers for granted though as other competing summer fruits have also lifted their game, meaning to be sustainable we need to keep improving.

I'd like to thank my fellow directors that I have served with over the years for not only their friendship but also their willingness to give their time to help make the mango industry the best it can be. We haven't always agreed on the best way forward, however all discussions have been held in a professional manner. I am confident the current mix of some old hands, along with some new blood, will continue to move our industry forward. I also believe that Robert and the team will continue to deliver the strategy that the board has set. All the best.



Geoff Warnock
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KUNUNURRA: Following on from a very dry wet season the trees still appear to be in good condition on most properties.

The beginning of June started well with a number of cool nights and the formation of buds have been observed.

Some orchards are showing some spot flowering. This is occurring later this year, last year this started at the beginning of May; subsequently it is expected that picking will also begin later.

At the conclusion of last season some of the growers from the region planted a number of new varieties. It is pleasing to see how well they are developing.

Some interest is being shown in getting this region involved in the export markets that are opening up at the moment.

On a final note, I take this opportunity to wish Samantha Frolov all the best in her new role.

“I’d like to thank my fellow directors that I have served with over the years for not only their friendship but also their willingness to give their time to help make the mango industry the best it can be.”

- Gavin Scurr (outgoing Director)



SOUTHERN QUEENSLAND & NEW SOUTH WALES



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an export market review. It was also good to see many familiar faces at the event. I thank the event team that put the conference together, I really enjoyed the Gala Event at Fannie Bay Gaol. I look forward to next conference.

AMIA’s Annual General Meeting (AGM) was held on 31 May 2019. I would like to thank Gavin Scurr for his long-term investment during his time on the AMIA Board and wish him the best for the future. I would also like to welcome two new faces to the board, Joseph Perry and John Nardi.

I wish all growers a good season ahead.

It was fantastic to see many growers at the mango conference this year in Darwin. The conference was an excellent opportunity to be updated on industry research and to catch up with old friends and make some new ones.

I would like to thank everyone involved in the planning and execution as well as all of those who presented and attended. If you did not have a chance to attend the conference, I would recommend that you view the speaker presentations, which are available on the [AMIA website](#).

Looking forward to coming events, I would like to encourage all growers to keep a close eye on the dates for the upcoming roadshows for this season. Roadshows provide growers with a great opportunity to be updated on the planned activities for the coming season as well as industry developments. If you have not attended a roadshow before I would strongly encourage you to come along.

I would also like to encourage growers to ensure they are on top of the recent changes to the Horticultural Award. Some of you may be fully aware of the recent rulings, however, for those of you who are not I strongly recommend you visit: <https://www.fairwork.gov.au/about-us/news-and-media-releases/website-news/changes-to-the-horticulture-award> to gain a better understanding of how these changes might affect your business.

As always at this time of year, I wish all growers the best with flowering. Some cooler nights in the region should hopefully promote strong flowering.

FAR NORTH QUEENSLAND & NORTH QUEENSLAND



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As the mornings get colder, we are starting to see mango flowers in the Top End. At the time of writing, the noise of sprayers can be heard most nights as farmers try to induce flowers.

The 2018-2019 wet season has been on par with our driest wet season on record. Water levels in the aquifer are below what we usually see in October, even though it is just the beginning of the dry season. I call on famers in the Northern Territory (NT) to make sure they are water wise as water availability may be an issue this year.

In May, Darwin held the 12th Biennial Australian Mangoes Conference at the beautiful location of Pee Wee’s Restaurant. There were a range of presentations including; robotic harvesting, overcoming supply chain issues, retailer outlooks and



John Nucifora
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The 2019 mango conference was one of the best I have been to yet. There was great unity between all parts of the industry. I was happy to see more Mareeba growers attend this year’s event and the feedback was great. By all reports, everybody I have spoken to said that they had a good time. I thank all sponsors that supported the conference.

At this point, trees in the region are dormant and growers are waiting for flowering for the 2019/2020 season. Winter pruning is under way.

Mareeba has had a good wet season; with steady rain until May. Trees have not stressed a great deal; it will be interesting to see the outcome once flowering begins. Let’s hope for a bumper season.

AMIA AND INDUSTRY NEWS

Board updates

Following the AMIA Annual General Meeting (AGM) at the end of May, we will say goodbye to Ray Courtice and Gavin Scurr and welcome John Nardi and Joe Perry to our board. We would like to thank both Ray and Gavin for their service. John and Joe will bring a wealth of experience to the board.

For John and Joe's contact details, please [click here](#).



Joe Perry



John Nardi

Welcome Minister

Australian Mangoes welcomes the new Minister for Agriculture, Senator the Hon. Bridget McKenzie, who was sworn in to the Australian Government on 29 May 2019.

Senator McKenzie is also the Deputy Leader of the Nationals and Senator for Victoria. She was born in rural Victoria and has a background in education. We have no doubt that she will be a great representative for agriculture and indeed the mango industry. We look forward to continuing to work with her.

Horticulture Award

The Fair Work Commission (The Commission) has published its decision on overtime payments for casual staff under the Horticulture Award 2010.

The Commission has advised that the new requirements should be implemented from the first full pay period on or after 15 April 2019.

A copy of the decision can be found [here](#).

New NT Farmers CEO



Paul Burke has taken the helm as Chief Executive Officer (CEO) of peak horticulture industry organisation, NT Farmers. The previous CEO Greg Owens will remain at the organisation in the role of Industry Development Manager (IDM). Australian Mangoes welcomes Paul to the role and wishes Greg all the best as he steps back into the role of IDM.

To view the announcement from NT Farmers [click here](#).

Need help looking for workers?

The National Harvest Labour Information Service (NHLIS) is a no cost service, paid for by the Australian Government and provided by MADEC Australia, to assist agriculture and horticulture businesses in finding seasonal labour.

The service advertises vacancies nationally and provides a trained consultant to take the many calls that are often generated. Your time is not wasted with people who do not fit your criteria, allowing you to get on with your core business.

Criteria may include such things as experience/qualifications, whether the callers have transport and accommodation, length of time the worker needs to stay etc.

The NHLIS provides a toll free 1800 number for workers to ring staff, then put suitable callers through to you by the method you prefer, e.g. direct phone call or email. Vacancies are registered on the government's [Harvest Trail website](#), as well as social media.

Please call the NHLIS toll free number 1800 062 332 for more information.

Madec were one of our Emerald sponsors at the 12th Biennial Australian Mangoes Conference.

We thank them for the support.

See page 23 for more about attracting new talent.

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Growing a greener future

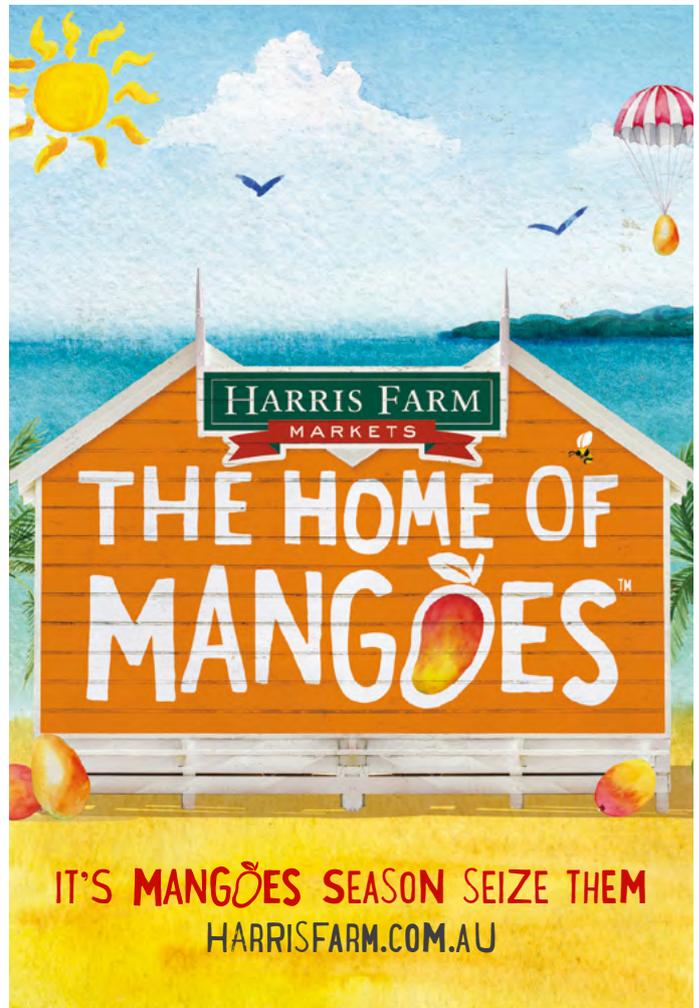
As part of our commitment to a greener future, we're working with conventional and organic fruit and vegetable growers to help them start or increase organic production.

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Find out more at woolworths.com.au/organicgrowthfund



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dpird.wa.gov.au

6166/19

Conference a success

The 12th Australian Mangoes Conference held in Darwin in May proved a huge success, with more than 220 delegates in attendance. Australian Mangoes were pleased to see so many of our industry stakeholders from across the supply chain in attendance.

A key highlight of the event was the announcement of our focus areas of our best practice management resource; supply chain temperature management, decision to pick, and orchard management.

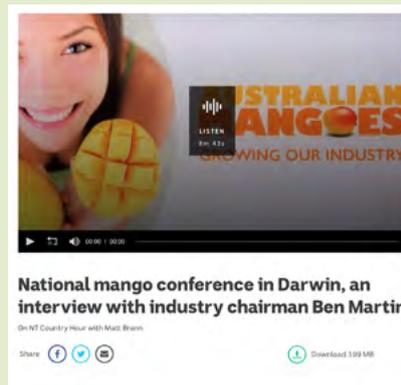
We were joined by media outlets [ABC Radio Darwin](#) (NT Country Hour) and [Freshplaza](#), who both published a number of great stories and interviews from conference. Over 25 pieces of media coverage were generated in total! Media and delegates also used our conference hashtag #12AusMangoConf on social media to keep others abreast of conference proceedings.

If you missed the conference, a number of the presentations are now available [online](#).

Australian Mangoes would like to thank everyone that attended, presented and supported the conference and are looking forward to the next one in 2021.



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ESO & WHSQ update

Update from the Electrical Safety Office (ESO) and Workplace Health and Safety Queensland (WHSQ).

GUIDES

The agricultural sector continues to be over represented in electrical safety incidents. To assist industry stakeholders in working safely, please find links below to two documents from ESO and WHSQ:

1. [Agricultural Risk Forum 20 March 2019 \(outline\)](#)
2. [Community Powerline Safety Plan](#)

The first document outlines discussions from the Agriculture Electrical Risk Forum on 20 March 2019. In particular, it outlines simple actions which all farmers can take to improve the safety of themselves, their families and their workers, including:

- moving irrigation pipes, machinery and other large items away from under overhead electricity lines
- asking Ergon Energy for free safety advice about electricity lines and poles on the farm. Ergon Energy can provide free 'Look up and live' advice and products, prices for line markers and their installation, advice on painting power poles and stays, and property maps showing electrical infrastructure
- checking electrical equipment before use and disposing of defective items
- employing an electrician to inspect their home and farm and asking them to install safety switches on all circuits.

The second document is a Community Powerline Safety Plan. Particular recommendations for agriculture can be found on page 12.

ERGON ENERGY

Ergon Energy have recently released a trial of a new powerline safety planning tool on lookupandlive.com.au; that assists land owners to adequately plan work around powerlines.

When planning work near powerlines it is very important that powerline markers are installed to ensure harvesters and farm machinery operators keep the powerline hazards front of mind.

Ergon Energy now also have new very visible powerline markers called rotamarkers available for installation on properties. The rotating motion of these red and white markers draws the attention of operators and reduces the chance of operators having inattentive blindness and not seeing the powerlines when operating near them. Glen Cook from Ergon Energy talks about the rotamarkers in [this video](#).

It is a legislative requirement to always use safety observers to maintain a three metre exclusion zone from powerlines. The markers also comply with aerial applications operations for aircraft keeping all workers safe while working for growers.

PRIORITY INFRINGEMENTS

WHSQ have updated information regarding priority infringements for agriculture industries. Priority infringements include; reporting incidents, hazardous chemical register, managing confined spaces and electrical.

If an inspector finds an issue relating to any of these key areas, they will issue an infringement notice which carries a monetary fine.

For further information visit the WHSQ Compliance, Monitoring and Enforcement Policy [here](#).

For more information on working safely in the agriculture industry, visit worksafe.qld.gov.au/agriculture.

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08 6376 6000

Update from the ATO

GUIDES

With tax time upon us, the Australian Tax Office (ATO) have developed a range of work-related expense guides to assist you with completing your tax return:

- [Tradie poster](#)
- [Office worker poster](#)
- [Clothing and laundry guide](#)
- [Self-education guide](#)
- [Travel expenses guide](#)
- [Claiming mobile phone and internet guide](#)
- [Tools, other equipment and assets guide.](#)

The ATO have also prepared a guide for small business, which you can view [here](#).

SINGLE TOUCH PAYROLL

[Single Touch Payroll](#) is now law and employers with 19 or fewer employees are required to start reporting their tax and super information to the [Australian Taxation Office](#) from their payroll software from 1 July 2019. Find out more [here](#).

Study to map new agricultural export market opportunities

Producers in the Mackay, Isaac and Whitsunday (MIW) regions will reap the benefits of a new project looking to identify new export market opportunities for existing and new high value agricultural products.

The Cooperative Research Centre for Developing Northern Australia (CRCNA) collaboration brings together the Greater Whitsunday Alliance (GW3) and key stakeholders North Queensland Bulk Ports (NQBP), Regional Development Australia Mackay Isaac Whitsunday (RDAMIW) and Bowen Gumlu Growers Association to transform the region's agriculture, production, infrastructure and export sectors to meet existing and future international market demands.

Read the full story [here](#).

Update from Hort Innovation

SEEKING MANGO SIAP EXPRESSIONS OF INTEREST

Expressions of Interest close at 5pm on Thursday, 1 August 2019.

Are you a grower or do you work in the mango industry supply chain? Would you like to collaborate with other growers, industry representatives and Hort Innovation on research and development (R&D) and marketing levy investments? Then submit an Expression of Interest to join the mango Strategic Investment Advisory Panel (SIAP).

For further details [click here](#).

HORT INNOVATION STRATEGIC THEMES

Hort Innovation has released the draft strategic themes that will form the basis of the next four-year strategic plan. These themes have been informed by consultation with over 300 industry participants including growers, researchers, delivery partners, government officials, industry representatives, peak bodies and staff across the country, and will provide direction for Hort Innovation going forward.

If you haven't had a look, you're encouraged to provide feedback. Please [click here](#) for further details.

New version of the EPPRD

A new version of the Emergency Plant Pest Response Deed (EPPRD) was issued on 15 May 2019 and is now available on the Plant Health Australia (PHA) website.

Read more [here](#).



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PR & MARKETING

Falling in love with mangoes

Over the past five years the entire Australian Mango Industry has united in the quest to meet and exceed consumer's expectation of a great mango experience, our efforts have fuelled an ever increasing appetite, resulting in more households buying mangoes, and buying on more occasions.

From the 2013 season to the 2018 season, volume sold through the domestic retail market grew by 42.2%, while price grew by 7.8% resulting in a value growth of 53%.

The 2018-2019 season ended with the second largest production on record and only 10% down on the 2017-2018 season (the largest in the history of the Australian Mango Industry). The flow of the 2018-19 crop was significantly different to the previous season with a later start and a more condensed 'peak' which saw a greater volume of fruit reaching the market during November, December and January.

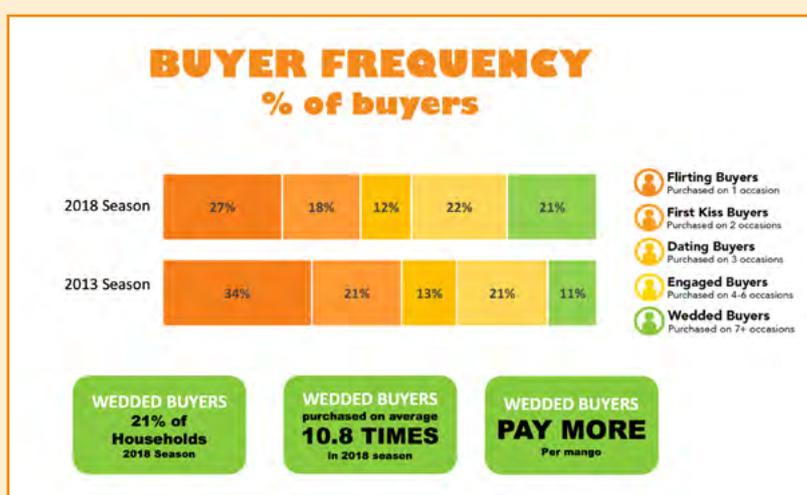
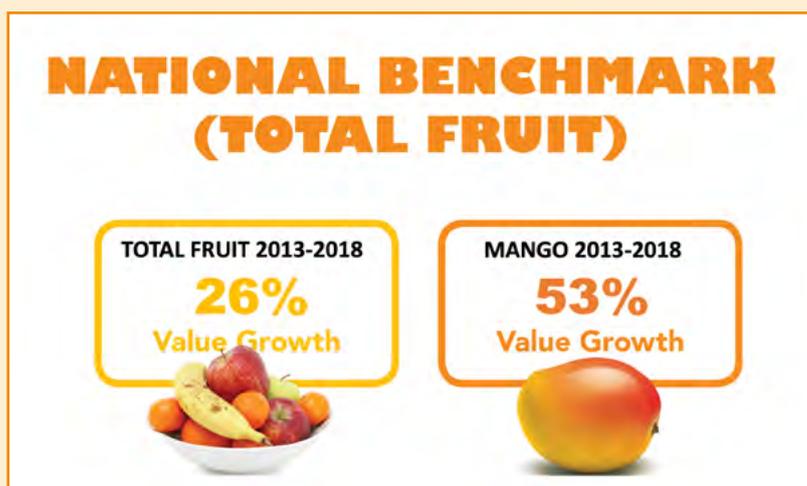
More Australians are falling in love with mangoes as the industry continues its focus on forecasting and quality, delivering fresh and vibrant mangoes to the shelf, and ensuring every mango is packed with the unique mango flavour Australians passionately refer to as the "taste of summer".

We break mango buying households into five distinct groups based on 'loyalty', which is measured by the number of occasions a household buys mangoes during a single season, and we refer to the transition in customer loyalty as the 'ladder of love'. Our job as an industry is to move households up the ladder from 'flirting' buyers on the bottom rung (households who buy on one occasion during the season) through to 'wedded' buyers on the top rung (households who purchase on seven or more occasions).

Over the past five years 'wedded' buyers have almost doubled in number growing from 11% of buying households in 2013 to 21% in 2018. In 2018 'wedded' buyers purchased an average 10.8 occasions, paid more for their mangoes than any other segment, bought 52% of all the mangoes sold at retail and were responsible for 54% of the dollars spent on mangoes. As we work to take consumers up the ladder of love and into the 'wedded' buyer segment we simultaneously want to attract new customers to the category, and from 2013 to 2018 we have attracted 871,000 new households with 580,000 becoming 'wedded' buyers.

Based on the strong growth over the past five seasons, the increase in population, and industry's continued focus on the 'wheel of velocity and momentum', demand for Australian mangoes will continue to grow.

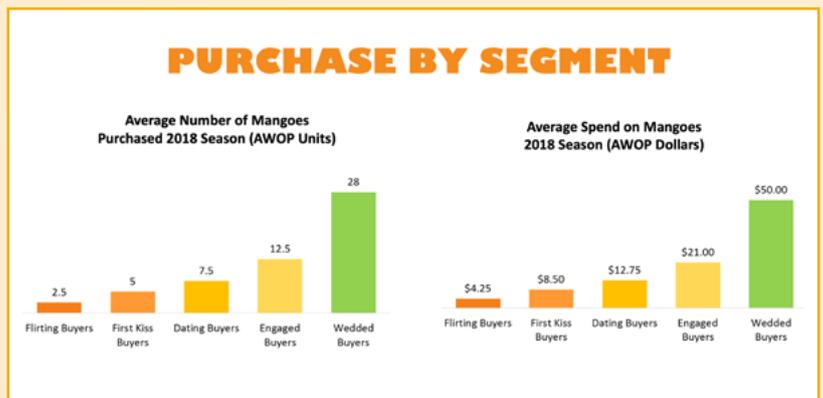
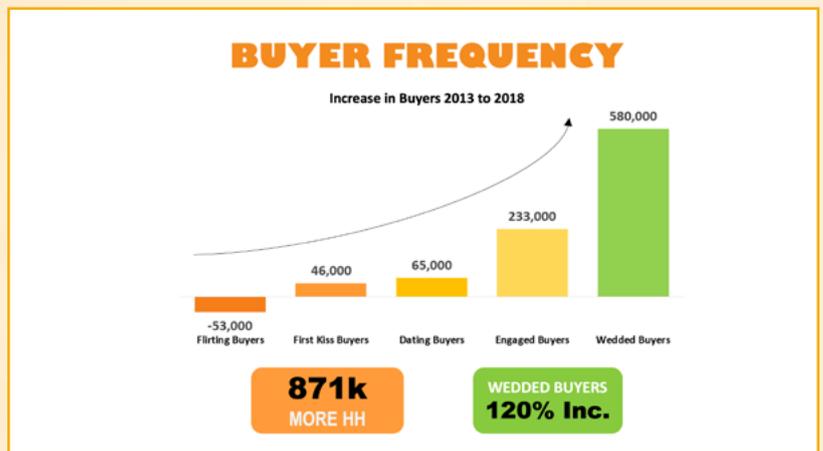
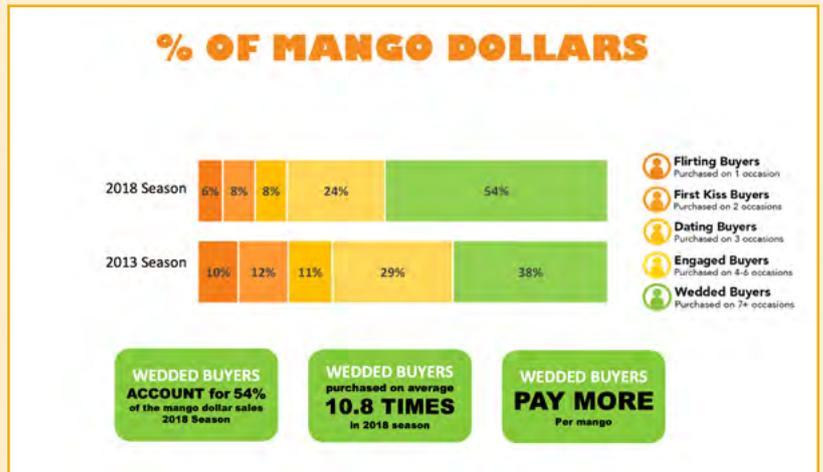
For more information contact Treena Welch at AMIA: marketing@mangoes.net.au, or 0417 001 253.



Sources: Nielsen Homescan

- 2013/14 Mango Season: 14/07/2013 - 22/03/2014
- 2014/15 Mango Season: 13/07/2014 - 21/03/2015
- 2015/16 Mango Season: 12/07/2015 - 19/03/2016
- 2016/17 Mango Season: 10/07/2016 - 18/03/2017
- 2017/18 Mango Season: 09/07/2017 - 17/03/2018
- 2018/19 Mango Season: 08/07/2018 - 16/03/2019

Our job as an industry is to move households up the ladder from 'flirting' buyers on the bottom rung (households who buy on one occasion during the season) through to 'wedded' buyers on the top rung (households who purchase on seven or more occasions).





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RESEARCH AND POLICY

GS1 Databar PLU labels for mangoes



Implementation of mango PLU labels to incorporate GS1 DataBar for loose product traceability and scannability.

Following communication last year, we are reminding growers and other relevant businesses, that when purchasing fruit stickers this season, major retailers including Woolworths, Coles and Metcash (IGA) are asking their Australian mango suppliers to move toward a more defined PLU label incorporating DataBar.

DataBar is a barcode which enables loose fresh produce to be identified, and quickly and accurately scanned at the Point-Of-Sale (POS) in a retail environment.

An Australian and New Zealand Industry agreement resulted in the barcode number (GTIN or Global Trade Item Number) to be allocated and maintained by the packhouse as follows:

- Each mango packhouse will need to register their own GTIN for each variety.
- Once each GTIN is registered, the appropriate GS1 verification report should be forwarded to your trading partners.

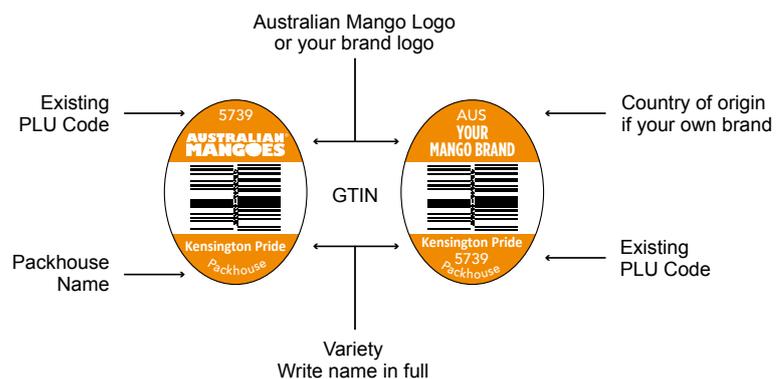
The items that retailers are asking to have incorporated into the new labels are as follows:

- Product description (not abbreviated e.g. Kensington Pride).
- Packhouse specific GTIN DataBar.
- Name of packhouse (not abbreviated).
- Industry Standard PLU number (for wider market application).
- Country of Origin e.g. AUS (if possible)—not required if you are using the Australian Mangoes Logo.

In addition, retailers are asking their suppliers to transition to industry colour coded PLU labels. See the example of label layout and specific PMS colours for each variety.

EXAMPLE LABEL

Dimension indicative only



- Kensington Pride PMS 144
- R2E2 PMS 485
- Keitt PMS 213
- All other varieties PMS 3965

The use of the mango industry logo is not mandatory, and you may continue to use your existing packhouse branding on the label artwork.

The Australian Mangoes logo and an artwork example is available, please contact Jessica Mitchell for a copy: com@mangoes.net.au.

If you need require assistance with artwork creation (design) please contact Andy Mathers: andy@corporateidentity.com.au.

For all information on DataBar please contact Melanie Wishart at GS1: melanie.wishart@gs1au.org.

Advances in what we know about RCD

A successful partnership between the ARC Training Centre for Innovative Horticultural Products, School of Land and Food, University of Tasmania and the Northern Territory Department of Primary Industry and Resources is driving research to help understand the causes and control of resin canal discolouration (RCD).



PhD candidate Umar Muhammad, spent two harvest seasons at the Berrimah Agricultural Laboratory in Darwin working on experiments with Dr Cameron McConchie and Dr Lucy Tran-Nguyen. During this time, he utilised molecular techniques, and pre and post-harvest protocols to study the cause and management of RCD in mango fruit.

This work has shown that contamination of RCD is due to an infection which may occur through contact with the inoculum in water. Once contaminated, all stages of the packing line in which the fruit has come into contact are potentially hosts for RCD. This means that regular and effective sanitising of harvest, packing and treatment equipment could reduce cross contamination of RCD. Further research is

needed to recommend a specific sanitiser as these are influenced by water quality, pH, concentration of active components, exposure time, potential interactions with fungicides and effects on picking and packing equipment, and cost. The effectiveness of a sanitiser system needs to be validated then regularly monitored and verified for effectiveness on an ongoing basis.

Mr Muhammad's results indicate that using a sanitiser cannot disinfest fruit that is already contaminated, but could reduce the spread through equipment and water. Other possible mechanisms for reducing contamination are: run to waste systems in harvest aids, constant monitoring of efficacy of sanitisers, regular sanitation of packing lines, reduce handling of fruit,

reduce repacking of fruit along the supply chain, regular sanitising of harvest bins, eliminate contact with soil and regular sanitisation of cool storage equipment. These results will allow each area of the mango supply chain to better manage and prepare for incidences of RCD.

A key result from Mr Muhammad's study to note is the difference in resistance to RCD across cultivars. Kensington Pride and R2E2 were highly susceptible to RCD infection whilst other cultivars developed no symptoms upon infection.

For more information, contact Dr Cameron McConchie at Cameron.McConchie@nt.gov.au or 08 8999 2310.



Alan Niscioli (Technical Officer, Northern Territory Government), PhD candidate Umar Muhammad and Maddison Clonan (Technical Officer, Northern Territory Government).



PhD candidate Umar Muhammad has discovered clues behind Resin Canal Discolouration in Australian mangoes.

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Why understanding climate change makes cents for the mango industry

At a recent workshop in Darwin, industry representatives heard that mango growing regions are set to warm up over the coming decades, with potentially serious impacts on mango production. Add in other changes, such as more intense rainfall events, and the news isn't good. However, action now by growers with an eye to the future will help ensure enterprises remain sustainable. Understanding available climate change information is critical to this forward planning.

Like the rest of the country (indeed, the world), Australia's mango growing regions are warming up. Long-term temperature records from the Bureau of Meteorology show that, on average, temperatures across the country have risen by around 1°C since 1910. And it's a trend that's set to continue.

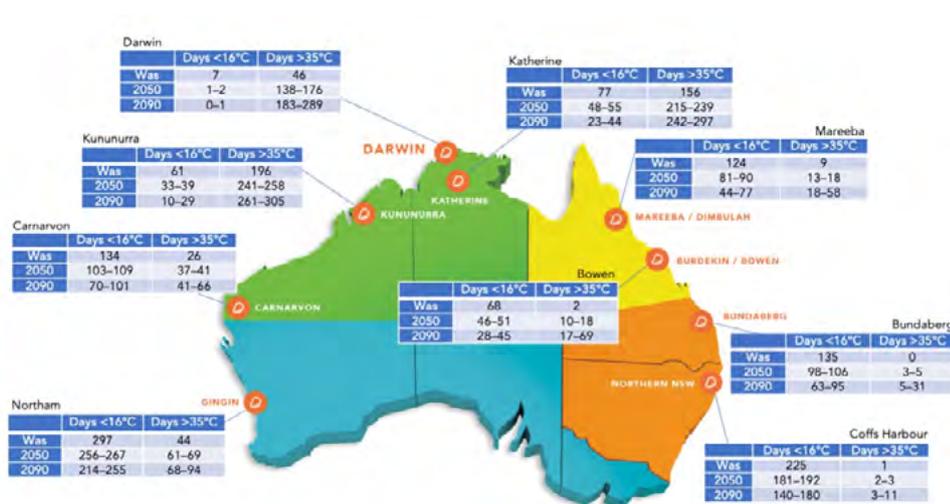
Along with warmer average temperatures, Australia's mango growing regions can expect more hot days and fewer cold days in coming years. While the outlook for average rainfall is unclear, extreme rainfall events will be more intense as will tropical cyclones, although fewer are expected.

The timing and extent of these changes will largely depend on greenhouse gas emissions. If they continue at the current rate the impacts will be severe.

WHAT DOES IT MEAN FOR THE MANGO INDUSTRY?

These impacts could include disruption to mango development*; new pests to manage, as the changing climate allows species to change their ranges; changes to the timing of growing seasons; and damage to crops from extreme weather events.

There may also be indirect impacts. For example, roads washing out in floods or being damaged through extreme heat could hamper fruit transport, and labour costs could increase as working conditions become more difficult.



Number of days per year below minimum temperature 16°C and above maximum temperature 35°C compared to 1981–2010 average

Projected ranges are for average number of days under lower (RCP4.5) and high (RCP8.5) emissions scenarios. From Climate Change in Australia threshold calculator.

WHAT CAN GROWERS DO?

The first thing growers can do is get informed about climate change, to understand what's in store for the future. Ensure your information is from a trusted source—CSIRO, the Bureau of Meteorology, and government agencies and departments are good places to start. Look for evidence-based information over opinion.

Some growers are already starting to

feel the effects of the changing climate and are taking steps to make proactive changes in their businesses, such as planting different varieties. Other adaptation strategies might include reviewing canopy management, nutrition and irrigation and shifting production zone. It is also worth considering the consequences of a changing climate along your supply chain, to identify climate sensitivities and consider ways to lessen their impact.

Of course, implementing these changes to mango enterprises is not trivial, and significant investments are not to be taken lightly. Understanding the extent and timing of climate risk before making decisions for the future is prudent.

FINDING AND USING CLIMATE CHANGE INFORMATION

Climate change projections are the best tools we have for assessing climate risk. They are developed using global climate models run on powerful supercomputers, and they provide us with plausible possible

*Impact of climate change on induction of mango flowering

The Earth Systems and Climate Change Hub is currently working with the Northern Territory Department of Primary Industry and Resources to assess the impact of climate change on six mango cultivars in northern Australian growing regions. The results are due to be released in March 2020, but you can stay up to date with project news and information here: <http://nespclimate.com.au/climate-change-impacts-in-the-northern-territory-mango-industry/> or contact Maddison Clonan at NT DPIR on 08 8999 2293 or maddison.clonan@nt.gov.au.

See also 'An industry-wide approach to assessing the risks of climate change' in this magazine on page 22, for further details about the project.

Explore the future climate

As well as maps, data downloads and publications, the *Climate Change in Australia* website has some useful tools for exploring the future climate.

Climate analogues

What will the climate of Kununurra, Katherine or Bowen be like in 10 years? What about in 30 years? The Climate analogues tool matches the future climate of a given location with locations experiencing a similar climate today (based on annual average rainfall and maximum temperature).

For example, under high greenhouse gas emissions Darwin in 2030 will have a similar climate to Batchelor, Aurukun and Weipa today. In 2050, it will be more like Jabiru and Oenpelli. There are presently no places in Australia (and possibly none in the world) with a similar climate to the one Darwin will experience in 2090.

Try it yourself at <https://www.climatechangeinaustralia.gov.au/en/climate-projections/climate-analogues/analogues-explorer/>.

Thresholds calculator

How many days above or below temperature thresholds can you expect in the future? Find out on the Thresholds calculator. This tool lets you explore the projected changes in days above or below a range of minimum and maximum temperature thresholds.

For example, Bundaberg currently experiences around 135 days per year with a minimum temperature below 16°C. In 2050, this could get as low as 98 days per year, while at the end of the century it could be down to 63 days per year. Similarly, Katherine currently experiences around 156 days per year with a maximum temperature above 35°C. At the end of the century, this could nearly double to 297 days.

Explore different thresholds at <https://www.climatechangeinaustralia.gov.au/en/climate-projections/explore-data/threshold-calculator/>.

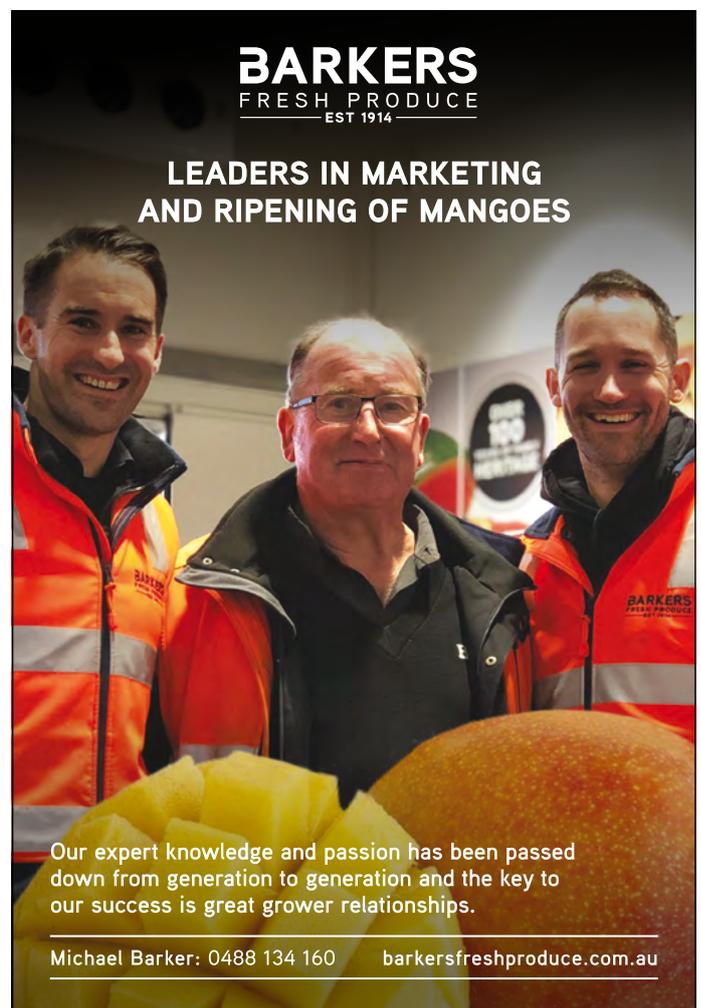
futures based on what we know about how the climate system works and on what we think greenhouse gas emissions might be. Because we can't predict what social, economic and political decisions are made in the future, global climate models use a series of standard scenarios to determine the parameters for very low to high emissions futures. At present, the world is tracking along the highest emissions pathway.

The latest climate change projections for Australia were prepared by CSIRO and the Bureau of Meteorology in 2015, and can be found at www.climatechangeinaustralia.gov.au. The projections are delivered in a range of formats, from high-level summary statements through to detailed datasets.

When using climate change projections, there are a few things to keep in mind:

- Projections are not predictions – they don't tell you what the weather will be at a specific time and place in the future; rather they give you a possible range.
- Projections are relative to the average over a reference period, e.g. 1981–2010.
- We have more confidence in some projections (e.g. temperature) than others (e.g. average rainfall) because of the models' ability to simulate them and because of our understanding of the underlying climate processes.
- Projections from global climate models are at a resolution of around 200 km square grid cells. Higher resolution (downscaled) projections can take this down to 25 km resolution.
- Not all risk management decisions require downscaled projections (which are not always available).

For more information about finding and using climate change information, contact Mandy Hopkins at the Earth Systems and Climate Change Hub on 03 9239 4649 or mandy.hopkins@csiro.au.



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An industry-wide approach to assessing the risks of climate change

The Northern Territory Department of Primary Industry and Resources (NT DPIR) is committed to building resilience in our horticultural industries.



Workshop at NT Department of Primary Industry and Resources, Darwin, learning about climate change and how this could impact mango production, with presenters from CSIRO, Bureau of Meteorology (BOM) and project partners.

In a new project, [NT DPIR](#) have partnered with NT Farmers Association (NTFA), Australian Mango Industry Association (AMIA) and the Earth Systems and Climate Change Hub; to identify how future climate conditions could influence mango flowering in the Northern Territory. NT DPIR are leading the industry-wide conversation about the concerns, opportunities and priorities of growers under future climate conditions.

For many years, the NT DPIR has studied mango flowering to improve our understanding of the triggers, limitations and practices which can be used to increase production. A recent Hort Innovation report, [“Manipulating mango flowering to extend harvest window”](#), describes some of these recent advances.

This project will illustrate how climate change scenarios may affect the drivers of mango flowering and will help to prepare growers for a changing climate. The entrance of new mango cultivars also allows us to compare flowering performance of the well-known cultivars with the new ones. Outcomes of this project will be reported in March 2020. In the meantime, project partners invite you to share your thoughts, concerns or any ideas around climate change research for sustainable production. Please [click here](#) to answer a few quick questions and provide comment.

For more information on this project, contact Maddison Clonan at maddison.clonan@nt.gov.au or 08 8999 2293.



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Addressing one of the key challenges of the mango industry: bringing new talent in

Identified in the Mango SIAP Strategic Investment Plan for 2017-2021 was a key challenge addressing a lack of skilled workforce and an aging industry. To solve this issue, Hort Innovation have partnered with program delivery partners Rimfire Resources and Australian Rural Leadership Foundation (ARLF) with an aim to increase graduate interest in careers across the Australian horticultural sector, including mangoes.

Commencing in 2017, the Graduate Engagement Program has two key objectives; attracting high quality new entrants and supporting their development to become future leaders that are passionate about the sector. Now with two successful years moving through 2019 sees an all-time high of 21 available placements, so there are plenty of opportunities for forward thinking industry partners to get involved.

Coordinated by Rimfire Resources, the program has two phases; a 10-week internship at a host company (Phase 1), and a graduate year employment with first class industry specific leadership training (Phase 2).

Phase 1 begins with your business choosing a specific project and scope of work that a university student can complete during their internship that delivers value to the business and builds job ready skills for the student. All going well, Phase 2 commences once the student has graduated (usually the end of the same year) and comprises of 12-months, full-time graduate employment within your business and a high quality and targeted leadership training component delivered by ARLF.

The program is co-funded by Hort Innovation's Hort Frontiers Fund and delivers exceptional value to any business

that is serious about accessing some of the best young talent on offer including those that might not have considered the Hort Industry as their future. The recruitment process is fully managed by Rimfire Resources, a niche service provider committed to the sector, but allows full control over the position, project and student selected by the host company. The program is designed to be wide reaching and encourages businesses to consider roles that are beyond the traditional scope of those studying horticulture or agronomy. Previous positions have included marketing, quality control, mechatronics engineers as well as the more traditional agronomy positions. The programs' aim is to attract the best young talent available at a university level and this is facilitated by offering an \$8,000 scholarship to accompany their internship, followed by a competitive graduate salary when they successfully progress to Phase 2. The leadership training valued at \$7,000 is also very attractive to our future leaders and as part of their first graduate year of employment adds tremendous value to their career development.

Connor Bourke is one of the 2018 participants and has recently moved into the graduate placement stage of the program with Manbulloo, working as a Horticulturalist (Quality Systems).

"I have been lucky enough to have the very knowledgeable and experienced Quality Manager as a mentor," Connor said "... who has patiently taught me an enormous amount of invaluable information. Even after a few months in the company, I still have a lot to learn as my role involves me understanding all aspects of mango production and distribution. The managing director has a compelling vision for the company's future and is constantly adjusting her long-term planning with 'big picture' ideas and surrounding herself with people with a wide range of expertise in necessary fields. This makes Manbulloo a very exciting company to be working for".

Two mango businesses have already taken advantage of what this program has to offer. Email Angus Guthrie from Rimfire Resources at gradlink@rimfireresources.com.au or call 1300 380 701 to see how your business can be involved and work towards future proofing your business and the larger industry by developing future industry leaders.



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PEOPLE & EVENTS



Robert Gray (CEO), Peter and Dianne Marks, Rob Vennard, Ken Rayner and Ben Martin (Chairman).

Visionaries recognised at 12th Australian Mangoes Conference

Three key contributors to the development of the Australian mango industry were recognised for their outstanding commitment at the 12th Australian Mangoes Conference.

Peter Marks, together with his wife Dianne, set up one of the first horticultural operations in Katherine and were committed to the mango industry for the last 30 years.

As well as having served on both the Australian Mango Industry Association and Northern Territory Mango Industry Association boards, Mr Marks was an industry leader, producing high quality produce for domestic and export markets.

He was also a strong advocate for the mango industry quality standards, in particular the flavour standards, measured

by dry matter testing with near infrared (NIR) machines.

Ken Rayner was recognised for his ongoing contribution to mango breeding. He has been cross-pollinating mango trees for over three decades; with the aim of producing advanced mango rootstocks and creating new varieties.

Two new varieties have recently been commercialised; Lady Jane and Lady Grace.

Rob Vennard was the visionary behind Manbulloo's plantation in Katherine. At

the time there was no other operation in existence like it and he is essentially responsible for transforming the Northern Territory (NT) mango industry.

Mr Vennard also contributed to the development of exporting Australian mangoes, through his involvement in the grower marketing group Australian Mango Exports.

Australian Mangoes CEO, Robert Gray, said Peter Marks, Ken Rayner and Rob Vennard were great visionaries who contributed enormously to making the Australian mango industry what it is today.

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Snaphots from the Australian Mangoes Conference



UPCOMING EVENTS

Australian Mangoes pre-season roadshows: save the date

WA

Kununurra – Monday, 5 August

NT

Katherine – Wednesday, 7 August

Darwin – Friday, 9 August

QLD

Bowen – Tuesday, 20 August

Ayr – Thursday, 22 August

Mareeba/Dimbulah – Tuesday, 27 August

Further details and other roadshows to follow in future communication.



