

Horticulture Innovation Australia

Final Report

Apple and Pear Technical Manager

Angus Crawford
Apple and Pear Australia Limited

Project Number: AP11014

AP11014

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Tel: (02) 8295 2300
Fax: (02) 8295 2399

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Summary

The Apple and Pear Technical Manager project (AP11014) was set up to drive the technical development and improve competitiveness in the apple and pear industry. This was a technology transfer project that was formed as part of the apple and pear industry's resolve to increase production of high quality apples at internationally competitive prices.

This project commenced on 1 September 2011 and was due to be completed on 31 August 2014, but was extended to 31 March 2016. During this time the project aimed to deliver outcomes in five areas:

1. Identifying R&D needs to fill gaps and capture opportunities.
2. Establishing and managing programs to deliver R&D outcomes.
3. Extending results to growers.
4. Reporting on R&D projects.
5. Other technical input and representation (matters ancillary to the above).

During the project a mid-term review was submitted in September 2013 by RJ Sully & FC Greenhalgh. This review assessed the outputs and outcomes to date and found overall that "this is a critical project for the systematic and effective transfer of technical information". The mid-term review recommended that the project continue a further 2 years to make it a 5-year project.

The Technical Manager's specific role was to coordinate and deliver the Future Orchards® project. Over the course of this project, the Technical Manager has led the expansion of Future Orchards activities. In the most recent iteration of Future Orchards the industry was delivered a highly successful program with impressive outputs and outcomes, with participation now at the highest levels ever seen for the project.

The Technical Manager's position has been increasingly recognised as a source of technical information to assist the Australian apple and pear industry. As was intended, new opportunities have been seized upon, which has led to increased grower engagement at a national level where information is now freely shared around the country. By recognising the benefits of intensification, new orchard plantings Australia-wide are now more modern and more productive.

The main new opportunities identified and implemented by the Technical Manager were Speed Updating and the Post-Harvest Seminars. The Technical Manager also led international study tours, and assisted state bodies, research organisations, Hort Innovation and the wider industry in engagement, planning and workshop activities for growers. The expertise supplied by the project supported activities and initiatives in communications, biosecurity, chemical regulation, pollination, and integrated pest and disease management.

Keywords

Technical Manager, APAL, Apple and Pear Australia Ltd, apples, pears, agronomy, pome fruit, extension, technical transfer, productivity, production, intensive.

Introduction

The Technical Manager project (AP11014) is one of the apple and pear industry's strategic initiatives to improve the international competitiveness of the industry.

This project was originally set up to address and prepare the apple and pear industry for the arrival of imported apples onto the Australian market. Compared with overseas competitors, Australia's productivity of apple and pears was lagging. In the early 2000's the existing low density orchard systems commonplace at the time meant average yields and pack-outs were too low for orchards to continue to be viable in the longer term.

The industry required new expertise to facilitate the transition to more high density systems that produce higher yields of quality fruit. In 2006, APAL's Future Orchards® program was launched and then in 2009 a Technical Officer (AP08039) was appointed to lead, manage and further improve Future Orchards. The now Technical Manager continues to lead Future Orchards which has made significant productivity improvements to the industry as well as an internationally recognised program for technical transfer.

This four and a half year project commenced on 1 September 2011 and finished 31 March 2016. Over this period the Technical Manager ran and initiated activities targeted at increasing grower's adoption of more modern and more productive orchard systems. The scope of the project increased as more opportunities and initiatives were identified where the Technical Manager is now widely recognized in the apple and pear industry is a source of technical information and essential industry infrastructure.

This final report will highlight the main areas of activities of this technical transfer project.

Methodology

The Technical Manager project aligns with the apple and pear industry's strategic plan *New Horizons 2015*. The third objective in this plan states: "*ensure industry has resources and capability by improved motivation, communication, and knowledge transfer of individual growers and the consequent development of leadership and skill competency.*"

During the establishment of the project concept the key roles of the Technical Manager were set to cover five main areas:

1. Identification of R&D needs – filling gaps and capturing opportunities

Part of the strategy was for the Technical Manager to identify additional industry R&D gaps and ensure these were pursued and converted into opportunities for the apple and pear industry. The Technical Manager has a well-established network of growers, researchers, service providers and government as well as an international network. This ongoing liaison provided valuable insights on topics taking in numerous perspectives from different parts of the industry.

The apple and pear industry has an established Research and Development (R&D) program in place with funds effectively committed already for long duration R&D projects. The major examples are the Productivity, Irrigation, Pests and Soils (PIPS) program and the other major projects such as Future Orchards.

During the project the Technical Manager put forward project concepts to be considered by the apple and pear Industry Advisory Council R&D sub-committee. The Technical Manager also participated in meetings which were in support of existing programs as well as frequent travel to regions and overseas to capture information outside of Australia.

2. Establish and Manage Programs – delivering R&D outcomes

Each time a new opportunity was identified, the Technical Manager pursued and managed the new programs.

A major program is Future Orchards where the Technical Manager led and coordinated all of the activities of the program. Future Orchards runs events for growers in eight of the major apple and pear regions of Australia at least twice a year and provides the industry with extensive access to R&D findings, new innovations and world's best practice. Future Orchards is now a separate Hort Innovation project led by APAL and run in partnership with AgFirst. The project also has a team of Front Line Advisors who support the project's activities, help to manage local events, and act as a key contact point for growers.

Newer programs that arose from the project were Speed Updating and the annual Post Harvest Seminar. Speed Updating was developed into a standalone project and delivered under Hort Innovation project code AP14003. The Post-Harvest seminar was formed as a 'user pay' event, independently supported by APAL and sponsors.

3. Extending results to growers

In this area, the key role of the Technical Manager was to help growers to learn from the results of and engage with the apple and pear R&D program. R&D programs themselves do not change operations on farm. The Technical Manager has managed a suite of the mechanisms by which growers and other industry personnel find out about R&D results and learn ways to apply them in their businesses. This does not just cover results from Hort Innovation funded research but outputs from other sources including international research.

The Technical Manager was Technical Editor of the Australian Fruitgrower magazine and worked with the APAL Communications Manager to provide input into the content of other APAL communications products to ensure content was accurate and relevant. The Technical Manager also wrote regular articles for the magazine and APAL's website, including recent articles such as:

- Crop protection product and usage updates: Dithianon withholding period now 21 days (<http://apal.org.au/dithianon-whp-now-21-days/>) and Getting ready for the next agri-chemical sweep-up (<http://apal.org.au/getting-ready-next-agri-chemical-sweep/>)
- Support for exporters on Maximum Residue Limits: Exporters, know your limits (<http://apal.org.au/exporters-know-limits/>)
- Study tour summaries: APAL's 2015 European study tour (<http://apal.org.au/apals-2015-european-study-tour/>)
- Reports on events: Post harvest seminar focuses on quality (<http://apal.org.au/post-harvest-seminar-focuses-improving-quality/>) and Lightbulb moments make for orchard innovations (<http://apal.org.au/lightbulb-moments-make-orchard-innovations/>)

Other mechanisms by which the Technical Manager extended results to growers are:

- Coordination of Future Orchards
- Speed Updating
- Post-harvest seminars
- Direct grower engagement (phone calls, in-person meetings and orchard visits, emails) and by providing personal technical support
- Group grower engagement through discussion groups on orchard management and by sharing new research outcomes.
- Presentations to industry eg: agronomists, Future Orchards, grower meetings, R&D Sub-Committee, APAL board and government.

4. Reporting of R&D Results

The Technical Manager was responsible for the delivery of the reporting for the Future Orchards and Speed Updating projects. All milestone and final reports for these projects were accepted and both projects have been renewed under APAL's management.

5. Other Technical Input and Representation (matters ancillary to the above)

The Technical Manager has also participated in a significant number of additional activities to ensure the apple and pear industry is represented and growers benefit from the technical knowledge accrued:

- Represented the apple and pear industry on matters relating to biosecurity.
- Supported the National Residue Survey increasing participation and communicating results.
- Participated in the Rural Industries Research and Development Corporation, Honeybee and Pollination Advisory Committee assessing research proposals and providing expertise in pollination.
- Participated in PIPs meetings with researchers providing feedback and developed communication strategies for the industry.
- Provided technical support, information and guidance to APAL staff, state bodies and industry to ensure accurate and helpful information about the apple and pear industry was communicated.
- Provided extensive advice and assistance to apple and pear growers to help ensure their chemical usage was in line with MRLs and export requirements.

6. Program Direction and Guidance

While points 1 to 5 describes the framework with which the project operated, the exact nature of the work, as expected, changed over time. An annual work plan was developed each year by the Technical Manager and approved by APAL management and Hort Innovation. These plans specified key activity areas of the project and ensured that the project met its objectives for each activity area with measurable KPIs and timelines.

Outputs

1. Identification of R&D needs – filling gaps and capturing opportunities

- The Technical Manager was responsible for initiating the “Research Speed Updating Program” where the apple and pear industry were provided a forum to be updated on the latest R&D. Two of these events were held which occurred in 2013 and 2015. The most recent in 2015 had over 150 participants.
- The specialist Post-Harvest sector of the apple and pear industry was re-engaged by the Technical Manager. Three Post-Harvest Seminars were delivered in 2012, 2013 and 2016. The most recent Post-Harvest Seminars in 2016 had over 100 participants recently.
- A new variety spreadsheet was developed and made available to the apple and pear industry. This addressed the concern growers had with the lack of information on new apple varieties providing an excellent start point on the variety origins, marketing arrangements and contacts.
- Growers have much to gain from overseas travel and the Technical Manager designed two

overseas tours. In 2012 growers were led through North America and in 2015 travelled through Europe.

- Through PIPS, the Technical Manager was involved with implementing and improving the R&D Strategic Investment plan with Hort Innovation (then HAL). The focus was to identify R&D gaps and determine if those gaps could have been converted to opportunities. A further focus was identifying duplication.
- Networks between chemical companies, regulatory bodies and the Technical Manager has ensured the changes which always occur in the regulatory setting was communicated to industry.
- An increasing emphasis has been on addressing Queensland Fruit Fly where the Technical Manager provided information to the industry through magazine articles and via the organisation of two events delivering updates to industry.
- Participation at conferences occurred throughout the course of the project which were held in Australia and overseas. This included the International Fruit Tree Association conference held in Boston, USA 2013 and another in Nova Scotia, Canada 2015.
- Areas of government activity where expert input from the Technical Manager was required were with chemical regulation (eg: Dimethoate/Fenthion review, Chemical Reviews, Spray Drift and the AgVet collaborative forum.)

2. Establish and Manage Programs – delivering R&D outcomes

- Future Orchards is the industry's national program for technology transfer. The program is managed and delivered by the Technical Manager in partnership with service providers AgFirst, a team of regionally based Front Line Advisors and SPW Solutions. The specifics of these outputs, which are extensive, are reported separately in AP11017 Future Orchards 3 Project. The outputs comprise of national orchard benchmarking, business grower development, webinars, orchard business analysis, magazine articles, regional focus orchards, monitoring and evaluation and orchard walks.
- In addition to the general project activities the Technical Manager was responsible for six project extensions ensuring Future Orchards continued to deliver to the industry. The new project concept for the forth iteration Future Orchards 4 was also successfully developed taking into account new funding arrangements.
- The Technical Manager developed the Apple and Pear Speed Updating program and delivered two of these events which extended results of apple and pear industry R,D&E projects.
- Three post-harvest seminars were held in 2012, 2013 and 2015.

3. Identification of R&D needs - Extending results to growers

- The Technical Manager manages the Future Orchards program which is the apple and pear industry's main physical link for getting extendable practical information generated both in Australia and overseas. The Technical Manager drives the delivery of these activities by participation and chairing each of the orchard walks.

- Results from the apple and pear industry PIPS research program (Productivity Irrigation Pests and Soils) were extended throughout the project. Researchers Dr Ian Goodwin, Dr Stuart Tustin, Dr Dugald Close and Dr Nigel Swarts have all taken part as guests for Future Orchards.
- Apple and pear industry researchers took part in the Apple and Pear Speed Updating providing forum for extending all of PIPS research.
- R&D was extended through the apple and pear industry communication programs which includes the Australian Fruitgrower, APAL website, regular eNews and social media. As the Technical Editor of APAL content, the Technical Manager is the link between the researchers and the apple and pear industry which initiates these various articles and communication pieces. Also, input such as technical editing of all communications by the Technical Manager ensures that the accuracy and integrity of content going out to growers is upheld.
- Other events which the Technical Manager delivered were three Post Harvest seminars as well as having direct involvement in four apple and pear industry conferences where the technical components were organised. Three successful Goulburn Valley based fruit fly events were put together and held in collaboration with Hort Innovation and local reseller businesses to help growers manage their transition to using area-wide management and, ultimately, roll out sterile insect technique.
- The Technical Manager supplied a range of different content including articles, short update blogs online, media engagement, quotes for other stories, and through presentations. Fourteen full articles were published in the magazine plus numerous specific updates scattered throughout the magazine and website. The Technical Manager met regularly with growers in one-on-one consultations and regularly presented to growers, advisors, researchers and other industry representatives.

4. Reporting of R&D Results

- The Technical Manager provided better access for growers trying to access reports from Hort Innovation funded projects and established links on the APAL website.
- Presentations on milestone reports were provided to the R&D sub-committee where the committee were updated on the technical elements of these reports. These presentations helped ensure the committee had a detailed understanding of the entire apple and pear research program. Preparation involved discussions with the researchers to ensure their research was represented accurately. This participation in the R&D sub-committee ceased during the project.
- The Technical Manager ran projects such as Future Orchards (AP11017), Technical Manager (AP11014), US Study Tour (AP12704), European Study Tour (AP14700), Speed Updating (AP12033 & AP14003) were reported as milestones and final reports produced. In 2015 the European Study Tour as a project, AP14700, was cancelled due to changes with Hort Innovation but the European Study Tour still occurred as growers paid their own way.

5. Other Technical Input and Representation (matters ancillary to the above)

- The Technical Manager represented APAL in meetings and forums in relation to areas of chemical regulation, biosecurity, climate change, export consultative committees, fruit fly,

nursery rootstocks, pears, honeybees and pollination. These activities generally required specific agronomic expertise in the apple and pear industry providing government policy advisors with information relevant in making informed decisions. The Technical Manager traveled to all apple and pear growing areas, which gives a good overview of the industry's issues and needs.

- Ongoing agronomic advice was provided to APAL, state bodies, growers, and advisors. This advice was aimed at helping to overcome issues relating to production, quality, post-harvest, pest and diseases. Many topical issues arose such as in the media in many areas that required technical input to enable industry to respond quickly and accurately to prevent inaccurate or negatively presented information reaching the media and consumers.

6. Program Direction and Guidance

- Throughout the project, APAL senior personnel provided program direction and guidance. Each year an annual work plan was updated which ensured the project was delivering the best possible outcomes for the industry. These plans were approved by APAL and by Hort Innovation and consistent with both organisations' strategic directions.
- As part of the project the Technical Manager took part in some professional development activities such as media training as well as APAL's Marcus Oldham Emerging Leaders course. The Technical Manager took part also in other industries activities such as conferences, Horticulture Industry Network (HIN), and field days.

Outcomes

This project targeted specific strategies identified in the apple and pear industry strategic plan *New Horizons 2015*. With this plan the industry will move toward producing high quality apples at internationally competitive prices and building industry capacity. These outcomes are difficult to measure but we believe and can demonstrate that the apple and pear industry is more competitive and productive as a result of this project.

The different ways the outcomes are assessed are through measured changes, behavioural changes and specific evaluations.

1. Identification of R&D needs – filling gaps and capturing opportunities

- The Technical Manager developed the Research Speed Updating program and two events were delivered. While the Post-harvest seminars engages a different segment of industry (less of orchard productivity focused more post-harvest) they deliver similar strategic outcomes.
- Speed Updating and the Post-Harvest seminars effectively align with the apple and pear industry's strategic plan *New Horizons 2015* which the third priority objective states: "ensure industry has resources and capability by improved motivation, communication, and knowledge transfer of individual growers and the consequent development of leadership and skill competency."
- The main outcomes from Speed updating and Post-harvest were that researchers, wider industry and growers are all engaged with good harnessed relationships between these parties. This helps adoption of new innovations and provides a link on how industry problems may be solved through current and new future research.
- In the case of the post-harvest it was particularly important that this part of the industry was successfully re-engaged with a renewed focus on measuring and improving quality.
- The two international study tours to Europe and the USA provided growers with the platform to identify ideas and opportunities for their own businesses. These study tours confirmed the need for mechanisation, new emerging varieties and the importance of young tree development. These outcomes were communicated to be research priorities through the phase 2 of PIPS but no projects of this type received funding.
- The apple and pear industry through the Technical Manager remained updated on matters relating to chemical regulation and maintained good industry links with chemical companies, agronomists and consultants in this area. This ensures the correct use of chemicals that upholds Australian and international MRL standards.
- Participation at conferences ensures that the Technical Manager maintains the necessary knowledge and networks in Australia and overseas. The Technical Manager through participation in international conferences and study tours has identified overseas guests for

Future Orchards, Post-Harvest seminar and conferences.

- The Technical Manager's participation in Fruit Fly activities and workshops has enabled growers to understand area wide management better and manage Fruit Fly with fewer chemical options.

2. Establish and Manage Programs – delivering R&D outcomes

- Technology transfer projects of the apple and pear industry are Future Orchards and the Technical Manager. These projects have achieved the following measured outcomes:

a) Increased average yields to greater than 40 tonnes per hectare;

- Average yields increased from 34 tonnes per hectare in 2008 to 40 tonnes per hectare in 2014. This is the trend corrected yield taken over six seasons from the apple and pear industry's "Orchard Business Analysis".
- Specific variety production per hectare increases are:
 - Pink Lady increasing from 38t/ha to 55t/ha (83% increase)
 - Royal Gala increasing from 20t/ha to 35t/ha (75% increase)
 - Granny Smith from 30t/ha to 55t/ha (83% increase)
 - Fuji from 20t/ha to 40t/ha (100% increase)

b) Quality was maintained with average Class 1 at 69%

- Class 1 packout is a revenue driver and indicator of the orchard business profitability. Class 1 packouts remained similar over the 6 seasons of the OBA. There is no clear explanation but an area which clearly needs greater focus.

c) Revenue per hectare has increased from \$52,825 in 2008 to \$64,604 in 2014.

- Revenue per hectare was achieved by increasing production and achieving good packout's. Price is the third factor which growers may see drop revenue per hectare.

3. Identification of R&D needs - Extending results to growers

- The Technical Manager drives many activities which lead to the extension of results to growers and the wider industry. These activities are Future Orchards, Speed Updating, Post-Harvest seminars, and other events as well as directly through APAL communications and also from one on one consultations.
 - The overall outcome is that R&D,E activities of the apple and pear industry is recognised, communicated and adoption facilitated.

4. Reporting of R&D Results

- Through the Technical Manager apple and pear growers have greater access to research reporting.

- Decision makers on the apple and pear R&D Sub-Committee were better briefed and engaged with the current state of play in Australia's apple and pear R&D program.
- The Technical Manager managed projects were all run successfully achieving impressive outcomes for the apple and pear industry.

5. Other Technical Input and Representation (matters ancillary to the above)

- Government personnel and other decision makers had access to the Technical Manager with expertise in the apple and pear industry who would assist them in making better decisions.
- APAL, State bodies (eg: South Australia Apple and Pear Growers Association, Fruit Growers Victoria etc.), growers and advisors were provided with independent advice on overcoming issues relating to production, quality, post-harvest, pest and diseases.
- The apple and pear industry are ready to respond to technical matters.

6. Program Direction and Guidance

- Management input to the Technical Manager ensured that the project remained consistent with the strategic objectives of the apple and pear industry.

Evaluation and Discussion

1. Mid term Review

In 2013, Russel Sully and Frank Greenhalgh conducted a mid-term review of this project. The review concluded that "this is a critical project for the systematic and effective transfer of technical information to apple and pear growers/packers in Australia with the aim of increasing the rate of adoption of improved technologies to enhance the international competitiveness of the industry."

2. Evaluations

Every event that was run was evaluated by issuing questionnaires. The results formed part of how any similar events were improved or refined during the project or for any new projects and were communicated in milestone reports.

The questions generally targeted participants' views on the value they got out of these events, which is generally if they have learnt anything today they could use in their business. More specific questions were asked which indicated how much these types of activities have changed their business. And then specific questions on the type of content they would like covered and any feedback they wanted to provide to industry.

a. Future Orchards

An evaluation form surveying Future Orchards’ participants which asked if they had made changes to their orchard as a result of being involved in Future Orchards. The results of this were impressive and showed that:

- 80% stated they had already made changes to their orchard;
- 13% had not made a change but planned to do so;
- 7% had not made a change and do not intend to do so;
- Therefore, 93% of Future Orchards participants had made changes as a result of the project.

Future Orchards is a separately funded project managed by the Technical Manager under Hort Innovation code AP11017. More details on the evaluations of this project can be found in its milestones and final report.

b. Speed Updating

Speed Updating was run in 2013 and 2015 where evaluations for both showed that the organisation and quality of presentations were excellent. Both events covered a lot of content but remained very engaging through the day. Feedback also captured participants’ views on how the next event should be run and what research they believed needed to be done to help their businesses. Speed Updating is a separately reported program managed by the Technical Manager under Hort Innovation code AP11014 and results from the evaluations are supplied in its milestones and final report.

Value of Speed updating to the apple and pear industry	Yes (2013 event)	No (2013 event)	Yes (2015 event)	No (2015 event)
Did you learn anything from today that you could apply?	93%	7%	100%	0%
Did you learn anything today that you will definitely pass on to growers and peers alike?	100%	0%	97%	0%

c. Post-harvest seminar

The Post-harvest seminar was run in 2012, 2013 and 2016. All events were successful in delivering high quality content which was of high value to the industry's post-harvest sector. The evaluation in 2016 showed that the format and time of year for the Post-Harvest seminar is the correct one and this should be an annual stand-alone event separate to any conference.

Value of Post-harvest seminar to the apple and pear industry	Yes (2016 event)	No (2016 event)
Did you learn anything from today that you could apply?	98%	2%

Recommendations

- Hort Innovation continue to invest in technical transfer activities such as the Technical Manager project which target improved dissemination of information to orchard businesses.
- Any new project should include supporting documentation including program logic, monitoring and evaluation plan, stakeholder engagement plan, annual work plans, with risks stated, and oversight mechanisms.
- The new Technical Manager project should not be underreported as it has in the past and should include the full extent of the range of work and knowledge required of the role.
- While the fundamental activities of capacity building should continue. Any new projects should have full scope and include greater activity reporting in areas such as crop protection stewardship, chemical regulation and access to chemicals, post-harvest, biosecurity, nurseries and providing technical preparedness for export. These activities have formed a significant part of the role and are essential to successfully conduct the other functions of the Technical Manager so they should no longer be reported as "matters ancillary to the above".
- The Technical Manager with Hort Innovation should explore ways to better improve coordination and integration of work with other state-based IDO's.

Intellectual Property/Commercialisation

No commercial IP generated.

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