

Final Report

Almond Study Tour

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Delivery partner:

Almond Board of Australia

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Project:

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Summary

This project enabled the Australian almond industry to continue to build on the international network established with the Californian and Spanish almond industries that combined with Australia represent 94% of global production.

The US industry at 80% is the dominant world producer and invests \$80 million annually on research and market development programs.

The Australian industry acknowledges that the basis of our orchard production systems and processing capacity is technology developed in California. We have also benefitted from research undertaken in Spain to rootstocks and growing systems. As a result of this, the Australian industry has a policy to share our research results and other industry development knowledge and technologies with the US and Spanish industries. This has established a trusting relationship between our industry and the Almond Board of California and Spanish researchers and growers that facilitates the exchange of information and ideas.

The strong relationship with the Almond Board of California in particular has provided great value as the Australian industry has addressed a range of issues that are common to our countries' almond industries.

The funding of travel to allow the interaction of Australian industry members with counterparts in the US and Spain, and with researchers in these and other countries developing knowledge and technologies of interest has been the key to this network development. The ability to access the knowledge generated by experienced researchers and just as importantly the guidance in its use by the ABC staff, has delivered a high return on the investment from the study tours undertaken.

The benefits have extended beyond the direct participants in the engagement program as the visits have identified many contacts that have welcomed further visits from Australian industry members and researchers. The project has also enabled the US industry to grasp the dynamic nature of the Australian industry and our commitment to continuous improvement without being married to past practices. As a result, they have raised the prospect of co-investing with the Australian industry in research projects and are already funding some Australian researchers.

The project enabled the international network to be maintained and expanded and continued to facilitate the exchange of knowledge and technologies for the three-year period, 2016-2019.

The areas of research that were beneficial were:

- New varieties
- New rootstocks
- Nursery practices
- Pollination best practices
- Pest management
- Disease management
- Chemical use developments
- Tree architecture
- High density plantings
- New harvesting equipment
- Dust mitigation
- Autonomous orchard vehicles
- Sustainability program
- Processing technologies
- Hull waste management
- Value added hull products
- Food safety issues and management
- Market analysis and development
- Product development

Attendance at the three-day California Almond Conference each year facilitated learnings on many of these areas, as well as enabled a separate formal meeting to be held between the Almond Boards of California and Australia on the day before the Conference commenced. The Conference has an attendance of 4,000 industry participants and requires three auditoriums to conduct different presentations at the same time to accommodate the delegate numbers and cover their wide areas of interest. To best cover the relevant topics being presented, the project has funded the attendance of the ABA Chair, Neale Bennett and CEO, Ross Skinner. This also helped on the orchard visits and other meetings undertaken as part of the study tours.

The project also enabled an assessment of the future supply potential of major producing countries, USA and Spain, and also that of Portugal that is an emerging producer.

Reports on the study tours conducted were documented and presented to the ABA Board and relevant industry committees to extend the knowledge gained and as an accountability process. This was in addition to the milestone reports provided to Hort Innovation.

Keywords

Almond; industry; study tour; international networking; research and development

Introduction

The development of the Australian almond industry into a major horticultural industry has occurred in less than two decades. It is now Australia's most valuable horticultural export product and domestic sales growth has been around 10% per annum for many years. The industry is continuing to grow rapidly from 29,000 hectares in 2016 to 50,000 in 2019 with a productive capacity of 160,000 tonnes once orchards are fully mature. Already Australia's most valuable horticultural export crop, almond shipments will continue to grow strongly in future.

The Australian industry is the second largest producing nation closely followed by Spain but is dwarfed by the US industry that is 80% of global production. The Australian industry is closely modelled on the Californian orchards with the same varieties and production systems apart from irrigation and nutrition practices.

The US industry is also the leader in developing export markets and currently export to 100 countries. The size of the US industry also means it has specialist staff addressing trade and production issues within the Almond Board of California.

The Almond Board of Australia has established a beneficial relationship with the Almond Board of California that manages the \$80 million investment in R&D and Market Development programs for their \$10 billion industry. It is acknowledged that much of the technology used in Australia was developed by the Californian industry. The Australian industry recognizes this contribution and thus we have an open policy in relation to sharing the outputs of our research programs and the knowledge of industry participants, which in the areas of drought management, irrigation, nutrition, varietal breeding and orchard and processing equipment is valued by the Californian industry.

During the period of the previous project in this area the Almond Board of Australia received assistance from the Almond Board of California in relation to food safety research, product pasteurization and consumer concerns, pre-shipment sampling and testing, fumigants, trade issue management in Europe, India and China, industry statistics, market analysis, researcher visits, Conference presenters, insights into their research programs, access to research reports and attendance at their conference.

This project provided the resources to enable the Australian industry to interact with the US industry and other producing countries to further develop the network of contacts that provided knowledge in many areas and allowed a co-ordinated approach on trade issues including food safety, chemical registration and product standards.

The network established has extended to suppliers, researchers and progressive growers in the USA and Spain and has provided the foundation for development of strong relationships with many other persons within the Australian industry, as reciprocal visits have been undertaken and hosted by the Almond Board of Australia.

Several US researchers, met during the Californian Almond Conference, have visited Australia and presented at the Australian Almond Conference and at field days in the producing regions.

The project has also enabled the US industry to grasp the dynamic nature of the Australian industry and our commitment to continuous improvement without being married to past practices. As a result, they have raised the prospect of co-investing with the Australian industry in research projects and are already funding some Australian researchers. The US is also now taking a lead role in developing shake and catch harvesting technology that was initially proposed by the ABA as part of the advanced production systems for Australian almond orchards.

A visit by Hort Innovation's David Moore and Alok Kumar accompanied by the ABA CEO Ross Skinner was arranged with the Almond Board of California to discuss the funding mechanisms that would facilitate joint projects to be undertaken.

The broader international almond and other nut industries were also engaged through attendance at the International Nut Congress and a study tour of Portugal and Spain.

The Spanish industry, which has rootstock and hard shell variety breeding projects and a significant agronomic research program, has been regularly visited since 2013 and good contacts have been established to enable their breeding and high density orchard systems to be monitored. The relationships established in Spain were valuable in the tasks of addressing Aflatoxin issues and Agromillora establishing a tissue culturing facility in Mildura.

The ABA has strong processes in place to distribute the contact details of those people that are part of the developing network throughout the grower, processor and marketer segments of the Australian industry and to disseminate the information gathered.

Methodology

The project methodology has been based on the development of an annual program of study trips by the Almond Board of Australia that has been approved by the Hort Innovation project manager in 2018 and 2019. The annual programs have centered on attendance at the Californian Almond Conference that is held over three days and has a comprehensive program of presentations on production, processing and market development topics. It also has supplier exhibitors and an extensive poster section covering a wide range of research projects.

The Almond Boards of Australia and California also meet the day prior to the Conference and hold discussions on issues across the supply chain and also the management of the two organisations.

The annual study tours to California also look to visit the Davis campus of the University of California, nurseries, machinery manufacturers, water authorities and growers to seek out knowledge and develop relationships.

Participation at the annual International Nut Congress has enabled engagement with the nut trade and provided a forum to discuss issues impacting global supply and demand not only of almonds but all nuts which affects returns to Australian almond producers due to substitution of one nut for another depending on price and quality considerations.

The Congress enabled meetings with the staff of the International Nut Council to be held, developing a better understanding of their roles and establishing valuable contacts.

Outputs

The outputs for the project, (AL16701) Almond Study Tour program were:

1. Attendance at and report on the annual visits to the US to inspect orchard and varietal breeding developments, attend the California Almond Conference
2. Attendance at and report on the annual joint Almond Boards of Australia and California meetings attached to the Conference covering supply chain and R&D topics.
3. A further development of the network of contacts with staff of the Almond Board of California.
4. An understanding of the California Almond Sustainability Program (CASP) that has formed the basis of the Australian Sustainable Almond Program (ASAP)
5. An understanding of the orchard hygiene practices that are used to control pest insects in almond orchards.
6. Development of contacts within the Almond Board of Spain and with leading Spanish growers.
7. Report on the expansion of the almond industry in Spain and Portugal.
8. Visit to Spain to monitor the breeding and other research programs of IRTA and SITA including high density plantings and novel equipment being developed to harvest them.
9. Visits to the International Nut Congress.
10. Meeting with Frucom in Brussels that addressed market access issues in Europe for the nut industries.

Outcomes

The combination of activities within this project were designed to provide the industry with relevant knowledge from overseas industry participants and the further development of a network of contacts that facilitate the industry addressing issues and challenges that arise across the supply chain for Australian almonds.

The key outcomes of this project have been:

A key outcome of the project has been the awareness gained from the US industry's management of insect pests through orchard hygiene to overcome the damage occurring to almond nuts that had escalated and peaked in 2018. With the knowledge gained extended to growers in articles, videos and field days as best practice, the damage of \$25 million in 2018 was reduced by more than \$20 million during the 2018/19 growing season and the industry went a long way to restoring the export trade's confidence in the quality of Australian almonds.

Best practices in the treatment of bees whilst in almond orchards is another area where the knowledge gained from visiting the Californian industry has provided significant benefits to the rapidly expanding Australian almond industry, that needs to convince many more beekeepers to bring hives to the almond producing regions for pollination. Addressing beekeeper concerns about the treatment of their bees whilst on almond orchards is a key to having more hives available as the demand grows by 70% to accommodate current plantings. The Almond Board of California has provided permission to adapt their best practice publication.

The project has led to research concepts being entered into the innovation funnel that have been stimulated from the

study tour.

Following a trip to the USA that inspected an autonomous spray vehicle, the ABA put in a concept to Hort Innovation to develop and demonstrate an autonomous tractor suitable for use in heavily foliated orchards. The ABA was successful in the tender process, but the proposal has since been assessed as not meeting the multi industry requirement, due to funding only being provided by the almond industry despite the outcomes being relevant to several horticultural industries.

A further research concept is being developed on the use of almond hull to improve soil organic matter. This will involve researchers in Australia and California and funding from both countries' growers and government.

The trips have provided access to knowledge that will enable the industry to develop a sustainability program to support both the production and market development programs. The Californian industry has led the way in developing and documenting sustainable practices within the production sector of their industry and providing training to growers. Their sustainability program has proven important in supporting the license to farm in the US and to counter adverse public sentiment against the almond industry as a heavy water user during the drought. The Australian industry has drawn on the lessons learnt and is implementing the Australian Sustainable Almond Program (ASAP).

The project has facilitated knowledge gained in California, Spain and the EU that enabled the ABA to better address issues that arose during the period of the project in areas of market access and other trade issues such as the withdrawal of permission to use chemicals destined for the European market; health benefits of almond consumption; the trend to plant based diets, new varieties and rootstocks, harvesting equipment developments and tree nutrition research.

The International Nut Congress and the trip to Spain and Portugal allowed first-hand observation of the expansion occurring in these countries to assess their influence on global supply. The expansion of the US industry was also monitored and influences on future surety of critical inputs such as water and bees were analysed providing an improved understanding of future global supply and demand.

The ABA's Board and Committee structure has meant the study tour reports have reached key industry figures and the Communications Program (AL16000) and the Adoption Program (AL16001) have ensured the knowledge gained has been put before growers.

Monitoring and evaluation

The ABA Board provided direction on the annual study trip program approved by Hort Innovation's Research Manager and have reviewed the reports resulting from the trips. The Production, Pollination, and Market Development Committees have monitored the project and utilised the learnings to recommend changes to grower practices, actions regarding market development and access issues and development of industry initiatives such as the sustainability program ASAP.

An evaluation of the industry focus on orchard hygiene as a means of controlling insect damage, costed the savings from the damage levels in 2018 to those of 2019 as \$20 million in crop loss alone and the restoration of reputation for product quality on export markets is additional.

Recommendations

The project has provided access to the heavily funded Californian R&D and Market Development programs. It is recommended that the study tour program continues, as it provides value for money in the knowledge gained and also the relationships developed that assist in dealing with issues that arise and are best managed in a collaborative manner with the US and Spanish industries.

With pollination looming as a major issue, particularly with the loss of bee habitat due to the extensive bushfires, it is recommended that technologies to reduce the reliance on the current number of hives per hectare in the USA and other countries are investigated in future to bring immediate gains in this area to the Australian almond industry.

Refereed scientific publications

None to report.

References

None to list.

Intellectual property, commercialisation and confidentiality

No project IP, project outputs, commercialisation or confidentiality issues to report.

Acknowledgements

The ABA has worked collaboratively with the Hort Innovation staff in implementing the project. The contribution of those overseas researchers and industry members that have provided the knowledge that forms the information distributed by the Almond Board Australia is acknowledged.

The time and effort provided by industry members participating on the ABA committees in monitoring the project and providing guidance to ensure knowledge and technologies obtained adopted is appreciated.