

Australian Walnut Industry Development

Harold Adem
Victorian Department of Primary Industries (VICDPI)

Project Number: NT06001

NT06001

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Final Report

Horticultural Australia Project Number NT06001 (2010)

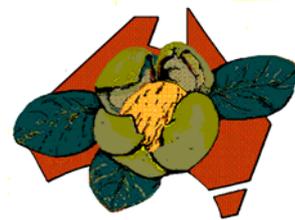
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Harold H. Adem

**Department of Primary Industries, Victoria
Tatura Centre**



Know-how for Horticulture™



Australian Walnut Industry Association



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Harold H. Adem

Department of Primary Industries, Victoria

Tatura Centre

Private Bag 1, Ferguson Rd

Tatura Victoria 3616

Australia

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For further information

harold.adem@dpi.vic.gov.au

Media Summary

NT06001: Australian Walnut Industry Development Harold H. Adem

The aim of the project was to ensure that the rapidly-expanding Australian walnut industry will become a successful industry through the adoption of the best technology from around the world. The first strategy was to appoint an Industry Development Manager (IDM) based at the Department of Primary Industries (DPI) Tatura, Victoria to collect, collate and interpret Best Practice Management information from national and international sources and package this for the industry. The second strategy was to review and update the Strategic Plan for the Australian Walnut Industry Association (AWIA). The third strategy was to conduct the 6th International Walnut Symposium in Melbourne in 2009 and access the latest research from key scientists from around the world. The outputs include the Symposium Proceedings, the Strategic Plan, a manual on Best Practice Management, a bio-security database, a Water Budgeting Tool and a Cost/Benefit Analysis for the industry. Further outputs include reports and demonstrations on the latest research as well as production techniques on walnuts through farm walks, meetings and publications in industry journals. The Symposium offered a unique opportunity for discussions between International and Australian scientists and walnut growers. The outcomes for AWIA were the creation of an IDM, adoption of Best Practice Management principles, a focus on the Strategic Plan, a risk management plan for bio-security, access to an international network of scientists and Best Practice Management information needed to compete successfully in the global marketplace.

**NT06001: Australian Walnut Industry Development
Harold H. Adem**

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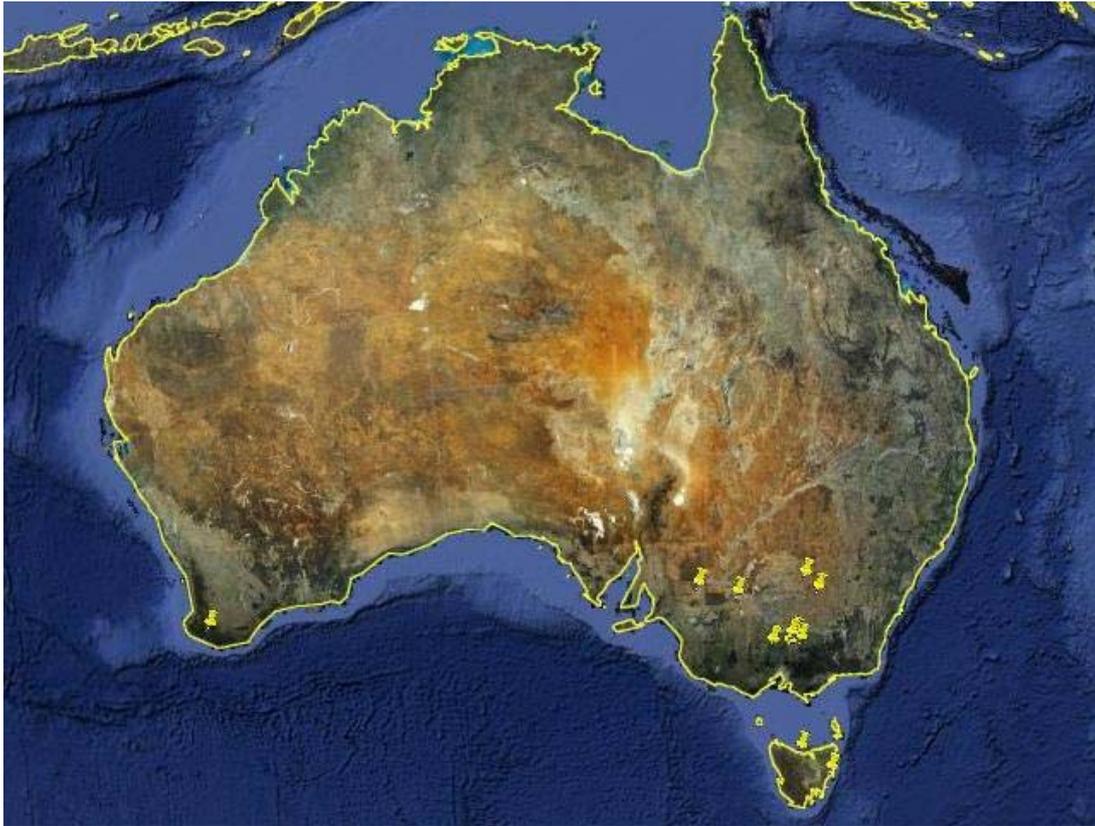
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1.0 Introduction

The Industry Development Manager (IDM) project was initiated to ensure that the rapidly-expanding, Australian walnut industry will become a successful, world competitive industry through the adoption of the best technology from around the world. DPI Victoria has provided initial support for the IDM position to facilitate the development of the industry with the aim that the industry would take responsibility for the IDM position at the conclusion of this project.

Walnut production offers a new and profitable industry to irrigated areas of temperate Australia. For example walnuts offer farmers considerable scope for diversification from traditional, flood-irrigated pasture and some relief from drought and water reform policies. A walnut industry brings new opportunity, employment and a lower impact on the environment because less land, water, nutrients and fewer chemicals are used to generate farm income. By intensifying tree densities (>250 trees/ha) and using micro-irrigation efficiently, walnuts could achieve a profitable return and yields of 5-6t/ha. Value-adding of walnuts (kernel, oil, liqueur, pickle, paste) can further quadruple the return and higher yields are possible (10t/ha reached in the USA) (<http://walnutresearch.ucdavis.edu/>). Other key factors in favour of walnut production are the mechanised harvest, low incidence of pest and disease problems (one disease, no pests) and public health benefits arising from consumption of a nut both high in unsaturated fat and in antioxidants.

Traditionally, the Australian walnut industry has been very small (production <200t) with wide spacing of poorly-trained trees. In the USA, 35% of orchards are less than 4ha suggesting that smaller orchards in isolated areas are viable because of the high value, long shelf-life and ease of transporting the crop to market. In the last decade, total walnut plantings have risen sharply from 500ha to over 5,000ha with orchards ranging in size from 4ha to >1,000ha. NSW has an estimated 3,000ha of walnut orchard Victoria an estimated 1,600ha, Tasmania 650ha and other states 400ha of established walnut plantings. Australia imports 96% or around 5,000 tonnes of walnuts each year but an expanded industry could supply both the domestic market and potentially export into lucrative, counter-seasonal markets in the northern hemisphere.



Map showing the major areas of walnut production (yellow markers)

The environmental, economic and social benefits are assured with an expansion in plantings that capitalise on the profitability, low pest and disease incidence, water-use efficiency, long shelf-life, mechanised harvesting, versatility, and health attributes of the walnut. The prospects for job creation in remote, rural areas, low environmental impact, import replacement and export into the northern hemisphere are strongly in favour of increased investment in walnuts. The Australian Walnut Industry Association (AWIA) has warned that with the rapid expansion of the industry and the attractiveness of the investment, there is an urgent need for guidance in advanced techniques of orchard design and management.

2.0 Technology transfer strategy and methodology

Over the last 20 years DPI staff at the Tatura Centre have worked in close collaboration with the AWIA. DPI Victoria has co-funded around ten research and extension projects together with support from the Rural Industries Research & Development Corporation and Horticulture Australia Limited.

The appointment of the IDM has assisted the Australian walnut industry so that it may benefit from the guidance and support from the DPI Victoria to achieve world-class production. The funding for this position provided limited time for input into the role at one day per week and consequently the delivery strategies were carefully targeted. The role of the IDM was to firstly to collect, collate and interpret Best Practice Management (BPM) of walnuts from national and international sources and secondly to assist in the review and updating of the

AWIA Strategic Plan for 2008-2012 (Appendix:3). The third activity was to assist in hosting the 6th International Walnut Symposium to be held in Melbourne in February 2009.

The IDM based at the DPI Tatura, Victoria has reviewed the industry Strategic Plan and provided information on Best Practice Management (BPM) for walnut orchards. Information was sourced from a network of leading researchers from around the world and culminated in February 2009 when AWIA & DPI hosted the 6th International Walnut Symposium in Melbourne. Key researchers at the symposium met with Australian researchers and growers and provided a clear focus for the industry and ensured that resources are directed in the most effective way.

Over the last three years the IDM has responded to a large number of enquiries from AWIA members and the general public on a range of topics from those requiring basic information before entering the industry to specific topics such as pests and disease, post harvest management or tree training. In many cases information was provided immediately from internal resources or at other times required an extensive search of the scientific literature. Where appropriate, the IDM has undertaken farm visits to advise on new walnut projects or to support existing ones. The IDM also maintained communication with the international walnut community with recent contacts from Italy, Spain, USA, Turkey, Russia, Iran and Bhutan.

The IDM role operated on the basis of one day per week initially working on the AWIA Strategic Plan, a review of the Quality Management Guide and attending the Walnut Symposium Committee meetings. The general business of telephone and email enquiries from AWIA members, potential members and the public continued on a weekly basis.

The timeframe for the project was 3 years. The review of the Strategic Plan commenced in the first year. The IDM worked closely with the AWIA committee and DPI staff to source and disseminate information and these activities were regularly reported to the growers via general meetings, the Nutgrower journal and the AWIA Newsletter. Farm walks and industry information sessions were organized to disseminate information to growers.

Critical Success Factors were that the members were involved in setting the direction of the IDM project. Relevant, achievable and realistic outcomes were set and AWIA members participated in the activities. There were few impediments to adoption or changes in industry circumstances to alter priorities. Scenario setting helped identify potential changes and allowed for strategies to cater for them. Grower unwillingness to share information was rare and addressed through relationship management.

Strategic Plan

In February 2008, the IDM hosted a meeting of fifty participants at DPI Tatura to discuss the Strategic Plan and BPM priorities for research & development (R&D) for AWIA. A professional facilitator, Michelle Howard, was engaged to assist in the technique of “The Principles of Open Space” to determine the priorities for R&D for the group. A combination of techniques was used in the meeting with industry members to develop a clear, concise and achievable strategic plan. The industry had already identified important objectives, but the strategies to achieve those objectives needed further development.

Development and implementation of the Industry Strategic Plan was undertaken to assist AWIA achieve objectives related to BPM. Drawing on the outcomes of the R&D meeting and

a review of strategic plans from other industries, the IDM compiled a first draft of the Strategic Plan and circulated it to members of the AWIA Executive Committee for comment. The Strategic Plan helped give an accurate picture of where the walnut industry is at present and its potential for future growth. The Strategic Plan was structured for the period 2008-2012 and regarded as a living document to be reviewed and updated as the need arises (Appendix: 3). The document included a Vision, Mission Statement, a SWOT analysis and Objectives as well as priorities for R&D. Following a review of the document by committee members the AWIA Strategic Plan has been amended, accepted by the executive, posted on the AWIA website and lodged with HAL. The IDM also conducted a review of the *Quality Management Guide*, the comprehensive booklet to be published by AWIA as a step-by-step guide for growing walnuts in Australia.

Best Production Practice

The major outcome for this was the production of the Best Practice Management Manual for establishing a Walnut Orchard. Information on BPM was sourced through literature searches, surveys and discussions with growers, consultants, researchers and extension officers. Data collected was not restricted to Australia; international information was reviewed to determine its potential for use in Australia. The BPM was compiled into training modules and information sheets and used in a workshop in collaboration with the Goulburn Ovens Institute of Technical and Further Education (GOTAFE).

A second major outcome for this work was the development and delivery of a water budgeting tool for the industry. On 19 October 2008 the IDM held a Water Budget Workshop at McGuire College Shepparton. The IDM developed a spreadsheet model to predict water use by walnut trees and schedule irrigation based on climatic data (Appendix: 1). The workshop was an interactive session to assist AWIA members in the use of a simple computer program to calculate the water requirement for each orchard based on evaporation figures and crop factors. Participants compared the calculated water needs with actual usage as well as scheduled irrigation and the cost of water. Course notes, free software and follow-up support were provided to all participants.

Walnut growers who were unable to attend and expressed interest were sent the workshop material by post. This model was particularly relevant in drought years and is arguably the best tool to both make a theoretical prediction of tree water use and then compare it with the actual water use. The model demonstrated how to improve water use efficiency and enhance tree performance. Another major benefit of the tool was that it also assisted growers with financial decisions on cash flow and water purchases.



Walnut growers attending the water budget workshop

International Walnut Symposium

On 25th-27th February 2009, the IDM assisted AWIA and the University of Tasmania host the 6th International Walnut Symposium held in Melbourne, Australia. It had taken 9 years to win the bid to host this prestigious event that, for the first time, was held in the southern hemisphere. The IDM was a member of both the organising committee and the scientific committee for the symposium. During the formal proceedings, the IDM presented a paper on an overview of the walnut industry in Australia, co-authored two other papers and chaired sessions on irrigation and orchard management. From the 22nd-24th February, the IDM escorted delegates on a pre-conference tour from Griffith to Mildura, the Tatura Centre and Melbourne visiting walnut, almond and pistachio orchards on the way.

Victorian Minister Joe Helper performed the official opening of the 6th International Walnut Symposium and welcomed around 150 delegates from 14 countries. Papers delivered at the Symposium and discussions held between international scientists, Australian scientists and walnut growers were used to further develop the AWIA Strategic Plan. The symposium proved to be a great success in showcasing Australia, the walnut industry and DPI to both a national and international audience. Many of the visitors commented favourably on our hospitality, organisation of the event and the Australian culture. The symposium was a giant leap forward in presenting the Australia as a rapidly-emerging industry at the cutting edge of walnut technology.



Delegates attending the 6th International Walnut Symposium



Minister Joe Helper officially opens the symposium proceedings



The IDM describes a soil profile to international delegates



The IDM presenting a paper at the symposium

Cost Benefit Analysis for Walnut Production

On 2 August 2009 the IDM, in collaboration with AWIA, conducted a workshop at DPI Tatura Centre. The workshop was focussed on a cost / benefit model based on a Microsoft Excel spreadsheet (Appendix: 2). Feedback from the 43 participants demonstrated that the workshop was highly valued and that it filled an urgent need to address the costs and returns of walnut production. Participants travelled from as far as Adelaide and central NSW to attend the event and walnut growers who could not attend were sent by mail a CD of the model and the notes given to participants.

The workshop activities featured:

- An interactive program using multi-media.
- Instructors to provide coaching in computer program operation.
- No prior skills in computer use needed.
- Free Excel software.

Growers were able to:

- Calculate the costs of establishing a new walnut orchard.
- Monitor ongoing costs and returns.
- Compare different tree spacing, yield, water prices and tree costs then see figures calculated automatically.
- See the impact of market prices on profits.
- Calculate the theoretical return on the investment.
- Predict cash flow into the future.



The IDM conducting a cost / benefit seminar for walnut growers

Biosecurity Database

In 2010 the IDM undertook a bio-security project for the purpose of constructing a database of growers in the walnut industry. The aim of this project was to establish a database for risk management of biosecurity issues. An unintended but significant outcome was the collection of industry data including cultivars, water resources and markets (www.walnut.net.au/). The project was predominantly a desktop study but allowed for farm visits to source information including details of non-members of AWIA. Presently, the database includes contact details of around 65 growers with details of property location (latitude & longitude), size of orchard, and a link to a satellite image on Google Maps.

Other Major Activities

In February 2008 during a farm walk at Strathfieldsaye Victoria, the IDM presented a seminar and demonstrated measurement of tree water status. On 21 and 22 November 2009, the IDM assisted AWIA in a Walnut Farm Walk and workshop held in the Wangaratta - Benalla region. A total of 38 people attended including 5 new members. The IDM, in collaboration with GOTAFE, developed a questionnaire that participants were required to respond to questions on orchard management for each of three properties visited at Gapsted and Myrree, Victoria. Other activities include presentations on irrigation scheduling, farm business management, biosecurity and marketing at the AGM in 2007, 2008 and 2009.

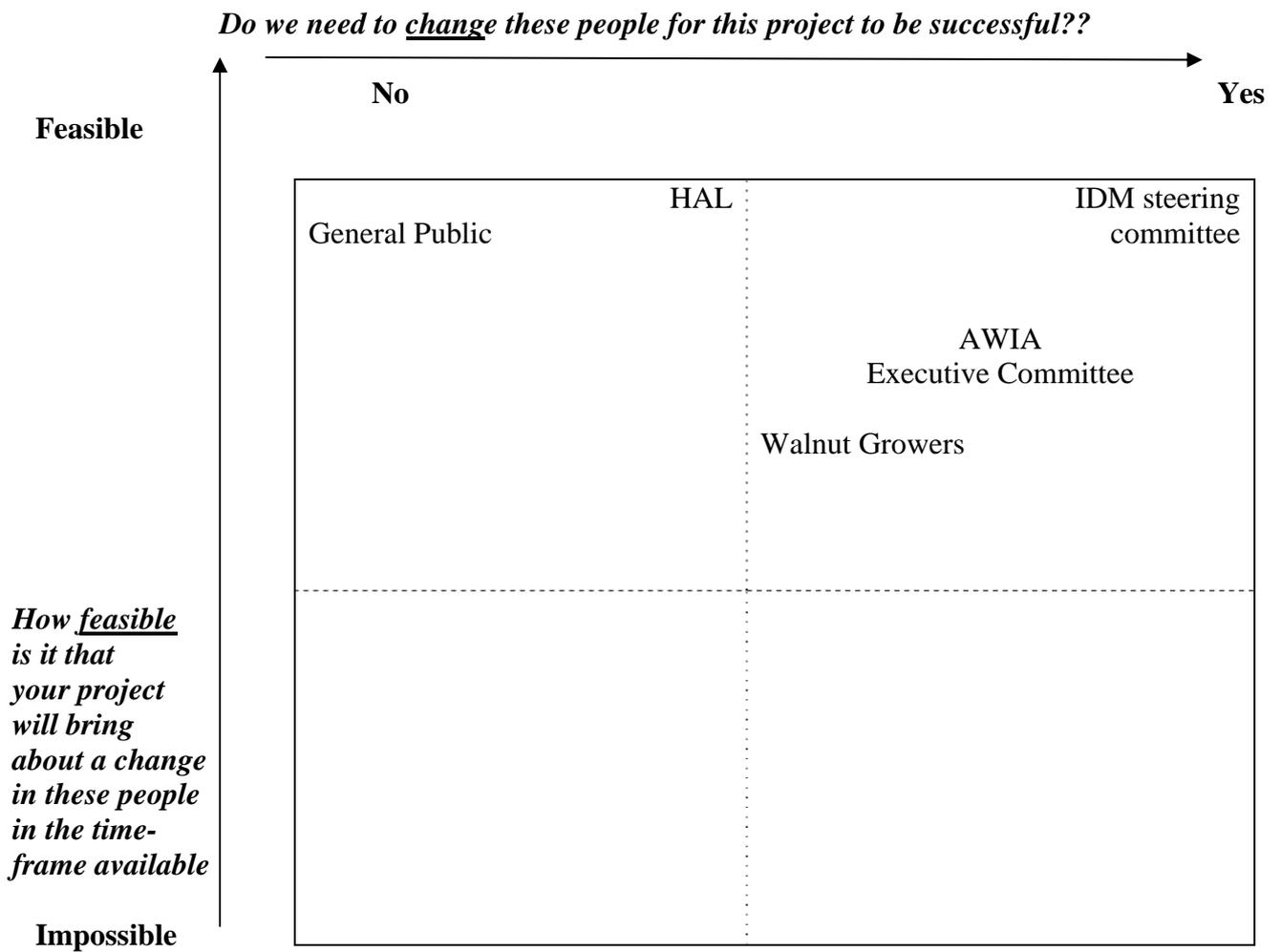


The IDM leads the discussion during a farm walk in the Wangaratta – Benalla region

3.0 Evaluation and measurement of outcomes – impact and adoption

Formal principles of project evaluation were undertaken in collaboration with the IDM Steering Committee reporting to the AWIA executive committee who were identified as the end user in the project. Members of the IDM Steering Committee were Mike Burston (Chair), Carol Kunert (AWIA Secretary), Cathy Mansfield (Sub-Project leader, DPI) and Harold Adem (IDM, DPI).

Understanding the project to be evaluated - Identifying Next User



Understanding the project to be evaluated - Project Outcomes

What would success look like for the project? <i>What will the Next Users be doing differently as a direct result of your project?</i> Success at this level should describe what your project is responsible for.	How does the success at the project level contribute towards improved economic, environmental and/or social conditions?
<ul style="list-style-type: none"> • Adopt training tools in Best Practice Management (BPM) • Have access to an international network of walnut experts • Better understanding of drivers of BPM • Change walnut industry perception of optimum productivity and quality • Empower walnut growers to make important management decisions through the use of training manuals and spreadsheets 	<ul style="list-style-type: none"> • Using a simple tools to educate can improve the economics of orchard management • Explains complex economic management in simple terms • Improves economic and environmental outlook by demonstrating cause and effect in interactive spreadsheets to avoid mistakes • Compares different management system to evaluate the economic and environmental impacts

**Understanding the project to be evaluated Program Logic –
Bennett’s Hierarchy for Extension**

Level	Description	Anticipated Outcomes	Gaps & Assumptions
7	SEEC Social, economic & environmental conditions achieved through use of improved practices and technologies	Improves economic and environmental outlook through new tools and improved practices.	Assumption is that social benefits follow
6	Practice Change Participant adoption of improved practices and technologies	Improved practices through a new and interesting way.	May not appeal to all age groups
5	KASA Change in participant knowledge, attitudes, skills and/or aspirations associated with participation in extension activities	Improved knowledge of the orchard environment. Attitude to new, educational tools changed. Improvement in computer skills for complex management systems.	Assumes a certain level of computer literacy
4	Reactions How participants feel towards messages and delivery process immediately after participating in activities	Walnut growers improve their learning whilst improving their profitability. Participants feel intensively engaged. Competitive spirit between participants.	Approach may be outside personal comfort zone
3	Next Users Who participates? What are their characteristics and requirements?	The AWIA committee members feel empowered with new tools to convey their message to their growers.	May undermine existing strategies
2	Activities Strategies, methods and scope of the extension events and the communication efforts	Exploration of the capabilities and opportunities for the walnut industry. Create an opportunity to demonstrate the flexibility of the orchard management system. Complex messages communicated with simple spreadsheets.	Growers need to apply information from the BPM manual, symposium, workshops and farm walks
1	Resources Time, money and staff (including volunteers) used to plan, promote, implement and evaluate programs	Project timeframe was three years with a budget of \$30k per year Staffing was limited to the Project Leader for one day per week (0.2 FTE)	Project time allocation too short

Planning the evaluation - Evaluation Audiences

Evaluation Audiences Who are going to make decisions about the project based on the evaluation?	What do they want to know about your project?	Why is this important?
AWIA Executive Committee	Are milestones on track? Is the budget adequate? Is the steering committee informed of progress and changes or setbacks?	AWIA has a responsibility to deliver on the project. AWIA share in the success. AWIA wants their contribution acknowledged.
AWIA Executive Committee	Will the project be completed on time? Have the milestones been reported on time? Will the outcomes be achieved? Is there a plan for further funding?	Need to justify industry funding for the project. Needs to meet Industry Strategic Plan goals.
HAL	Have milestones been met? Has the final outcome been achieved? Is the budget expenditure on track?	Projects need to demonstrate BPM. Investment in project needs to be justified. Is project going somewhere?

Conducting the evaluation – Credible evidence to answer Key Evaluation Questions

KEQs	Sources of evidence
To what extent were the project outcomes approved?	Comments from AWIA
What was the reaction of the steering committee to the project?	Minutes of AWIA executive committee meetings
How closely did the project align with the nominated milestones and predicted budget?	Project plan and review process with AWIA executive committee members
To what extent were resources, budget and timelines adequate?	Project plan and review process with AWIA executive committee members

4.0 Case study

In 2007 the IDM provided horticultural advice to the management of a new golf course being set up by the Croydon Golf Club at Yering near Yarra Glen, Victoria. A planning permit for the golf course was issued by the shire council on condition that an agricultural enterprise was included in the plan. The idea of combining a recreational activity with production horticulture was enthusiastically embraced by the golfing fraternity. Club members are eagerly looking forward to the first harvest of walnuts with the view to include them on the menu at the club restaurant. This multi-million dollar project has a high profile and further extends the range of DPI services to the community at large.

Traditionally, horticultural enterprises are generally conducted independently from recreational and sporting activities. Income from walnut sales will subsidise the cost of running the club. The walnuts will also feature as a signature food in the club restaurant. This project has provided a useful connection between food production and leisure activities by taking a rural enterprise to the city. Members of the Croydon Golf Club are clearly excited about the walnut project and it has changed their perception of horticulture and the role of DPI. The impact of the project extends beyond the club members to visiting players and the public who patronise the restaurant. The integration of a commercial walnut orchard into a golf course has addressed the issue of the loss of productive farmland whilst catering for the recreational needs of an urban society.



Croydon Golf Club at Yering, Victoria



The IDM planting the walnut orchard

5.0 Discussion

The IDM project has delivered on the agreed milestones in a timely manner. Tangible evidence of the success of the project is provided by the major outcomes; in the AWIA Strategic Plan, successful staging of the 6th International Walnut Symposium, the manual “Walnut Industry Best Practice Management for Establishing a Walnut Orchard”, the Water Budget Model, the Cost / Benefit Model, The Quality Management Guide and a bio-security database. Workshops, seminars and farm walks were conducted (two per year) on topics that included irrigation scheduling, farm business management, research priorities, walnut orchard management and bio-security.

Key outcomes of the project for walnut growers include an introduction to a network of international scientists, improved skills in irrigation management and farm business, greater awareness of BPM principles and bio-security issues. At the conclusion of a project formal systems have been put in place that will continue beyond the final report. In the IDM project these are namely a network of scientists, software models for irrigation and economics, a strategic plan, a BPM manual and an industry database for bio-security. The industry has been provided with some major resources and tools that contribute to and encourage the use of best practice management. There is a need for continued support for the industry to facilitate the adoption of these practices.

The role of the IDM has been greatly appreciated by industry. Bryan Goble, AWIA President wrote in his report tabled at the AGM in November 2009: *“Our industry has been fortunate to have a working partnership with the Victorian Department of Primary Industries and Horticulture Australia Ltd, with the employment of our Industry Development Manager. Harold will present to you a summary of his achievements over the previous year, but we should not overlook the benefit that this position has to our industry. Sadly his position through the Victorian Government is currently threatened, and immediate work needs to be carried out to ensure that this position is retained. This position has offered our members a number of training course including water budget and economic analysis, the winter seminar, a review of previous papers, presentation of the strategic plan and recent funding by the Victorian Government allowed Harold to perform a bio-security review of our industry”*.

6.0 Recommendations

Continuation of the IDM project with support from HAL and AWIA is strongly recommended. The Australian walnut industry is fast becoming a profitable and sustainable industry that could mirror the successes already achieved by the almond industry. The Australian walnut industry urgently needs the support of an IDM to ensure that BPM is applied so that the industry can develop into a profitable, export-focussed industry. Critical to the success of this project has been the involvement of the AWIA members in setting direction and that the targeted outcomes were realistic and achievable.

The current time for this project at one day per week provides limited opportunities for the IDM to facilitate and organise workshops and provide industry information. Ongoing access to information is critical for the industry and this should be provided with easy access to address new enquiries and provide information on best practice production for the industry.

This is still a small industry and with limited opportunities to fund the IDM position and additional support will be needed from HAL if the industry is to progress and it is recommended that this continue.

7.0 Acknowledgments

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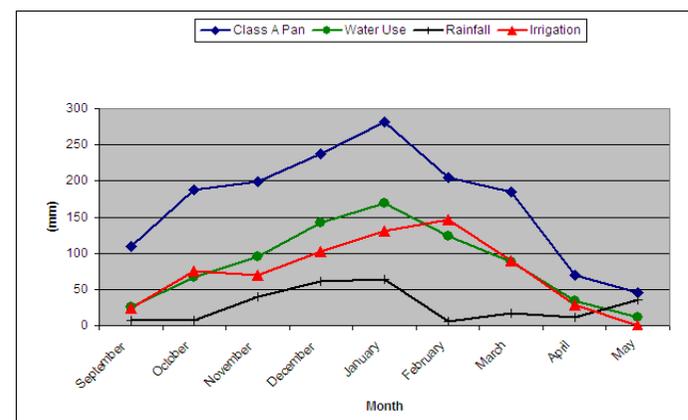
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Appendix: 1

Walnut Orchard Water Budget

Tatura - micro

Month	Evaporation Class A Pan (mm) A	Class A Pan Adjusted (mm) $B=0.8 \times A$	Effective Area of Shade (%) C	Crop Coefficient $D=1.5 \times B/100$	Stress Coefficient (RDI) E	Tree Water Use (mm) $F=B \times D \times E$	Rainfall 2007-2008 (mm) G	Irrigation Requirement (mm) $H=(F-G) \times \%IAE$
September	109	87	20	0.3	1.0	26	7	24
October	187	150	30	0.5	1.0	67	7	75
November	199	159	40	0.6	1.0	96	40	69
December	238	190	50	0.8	1.0	143	61	102
January	282	226	50	0.8	1.0	169	64	132
February	205	164	50	0.8	1.0	123	6	146
March	185	148	40	0.6	1.0	89	17	90
April	70	56	40	0.6	1.0	34	11	28
May	45	36	20	0.3	1.0	11	35	0
TOTAL (mm)						757		667
TOTAL (ML/ha)						7.6		6.7
Irrigation Application Efficiency (%)				80				



Appendix: 2

Walnut Cost-Benefit Analysis using Internal Rate of Return (IRR) as indicator of economic performance

Use the formula editing toolbar to trace precedent or dependent figures and to become familiar with the functioning of the spreadsheet

Change the assumptions (in green) to better reflect your own costs. This will automatically update the rest of the spreadsheet

Financing costs such as loans are not included in this spreadsheet

The time-adjusted (40year) figures below is based on 10Ha (as stipulated in the assumptions) and multiplied by thousand (\$000).

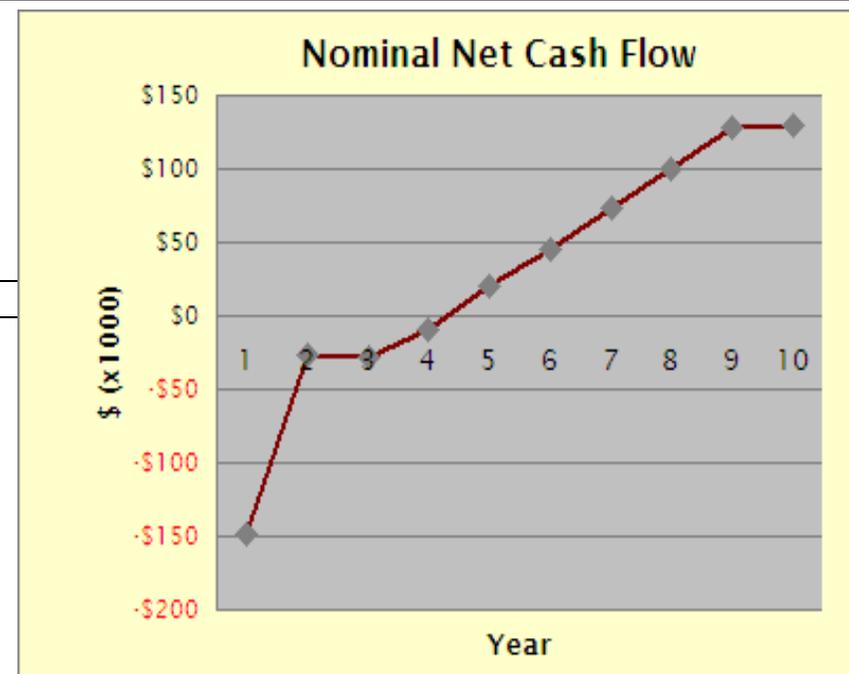
Walnut Project	(\$000)												
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
Establishment Costs													
Land (with water to boundary)	0												
Buildings, roads and fencing *	0												
Windbreaks and Dams *	0												
Water Entitlements	0	0	0	0	0	0	If you were going to purchase additional water entitlements over time						
Irrigation Ring Main *	0												
Orchard Irrigation *	0												
Land Preparation	5												
Soil Preparation	10												
Trees	83												
Planting and Staking	17												
Establishment Management	10												
Legal and Accounting	75												
Total	\$124	\$0	\$0	\$0	\$0	\$0							
Variable (annual) Costs													
Water Access Fee	0	0	0	0	0	0	0	0	0	0	0	0	0
Water Supply & Levy Costs	2	2	3	4	4	5	5	5	5	5	5	5	6
Fertiliser	1	1	2	3	4	5	5	5	5	5	5	5	6
Tree Training and Pruning	7	7	7	7									
Crop Protection	5	5	5	5	6	6	6	6	6	6	6	7	7
Harvesting	0	0	0	8	8	8	8	8	9	9	9	9	9
Processing and Packing	0	0	0	4	7	10	13	15	18	18	18	18	18
Distribution	0	0	0	0	1	1	1	2	2	2	2	2	2
Orchard Management	20	21	21	22	22	23	23	24	24	25	26	26	27

Insurance	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Rates	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	\$35	\$37	\$39	\$54	\$52	\$57	\$61	\$66	\$70	\$72	\$73	\$75	\$76	\$76
Yield per Hectare	0.0	0.0	0.0	1.2	2.3	3.5	4.7	5.8	7.0	7.0	7.0	7.0	7.0	7.0
Yield (tonnes)	0	0	0	12	23	35	47	58	70	70	70	70	70	70
Income	0	0	0	40	81	123	165	209	254	257	260	263	267	267
Net Income	-\$35	-\$37	-\$39	-\$14	\$29	\$66	\$104	\$143	\$184	\$185	\$187	\$189	\$191	\$191
Depreciation	0	0	0											
Tax	-\$10	-\$11	-\$12	-\$4	\$9	\$20	\$31	\$43	\$55	\$56	\$56	\$57	\$57	\$57
Cumulative tax	\$10	\$22	\$33	\$37	\$29	\$9	\$22	\$65	\$120	\$176	\$232	\$289	\$346	\$346
Cash Flow														
Cash Out	148	26	27	49	60	77	93	109	126	127	129	131	133	133
Cash In	0	0	0	40	81	123	165	209	254	257	260	263	267	267
Net Cash Flow	-\$148	-\$26	-\$27	-\$10	\$20	\$46	\$73	\$100	\$129	\$130	\$131	\$132	\$133	\$133
IRR (40 year no terminal value)	19.60%													
Free Cash Flow plus Sale	-148.41	-25.87	-27.39	-9.54	20.39	45.88	72.77	100.31	128.55	129.75	130.96	132.16	133.37	133.37
IRR (20 year -calculated terminal value)	19.60%													

Assumptions

Cost inflation (multiplier)	1.025
Price inflation	1.012
Tax rate	0.3
Exchange rate (Contract to \$1AUD)	1
Orchard area (hectares)	10
Orchard establishment mngt per Ha	\$1,000
Land (per hectare)	\$0
Buildings, roads and fences (Ha) *	\$0
Windbreaks (Ha) *	\$0
Dams (Ha) *	\$0
Soil prep (Ha)	\$1,000
Orchard ring main per hectare *	\$0
Orchard irrigation (Ha) *	\$0
Land preparation	\$500
Trees per hectare	550

* Assume as 0 if already exist on farm.
or not relevant



Trees	\$15.00													
Planting and staking (per tree)	\$3													
Fertiliser per hectare	\$400													
Tree training (over four years)	\$2,000													
Crop protection (pruning, spraying etc)	\$500													
First harvest - year	4													
Yield, tonnes per hectare	7.00	at year	10											
Harvesting per tree	\$1.25													
Processing and packing (Tonne)	\$247													
Disribution (Tonne)	\$25													
Sales Administration Fee (per hectare)	\$100													
Management and Admin (per hectare)	\$2,000													
Insurance Rates	\$50													
	\$30													
Price per Kg (\$AUD)	\$3.30	3.34	3.38	3.42	3.46	3.50	3.54	3.59	3.63	3.67	3.72	3.76	3.81	
Water usage per hectare (megalitre)	3.8	5.0	6.3	8.3	9.3	10	10	10	10	10	10	10	10	
Water cost per megalitre	\$0													
Water diversion and salinity per megalitre	\$12.5													
Water entitlement per megalitre	\$0													
Water Access Fee (per megalitre)	\$0													
Water Supply Fee (per megalitre)	\$13													
Local pumping per megalitre	\$15													
Total water delivery (total) per megalitre	\$40													
Management costs (\$ per Ha)														
Orchard Manager	1,000	1,025	1,051	1,077	1,104	1,131	1,160	1,189	1,218	1,249	1,280	1,312	1,345	
Equipment hire	200	205	210	215	221	226	232	238	244	250	256	262	269	
Horticulture consultants	700	718	735	754	773	792	812	832	853	874	896	918	941	
Audit	100	100	100	100	100	100	100	100	100	100	100	100	100	
Total	2,000	2,048	2,096	2,146	2,197	2,250	2,303	2,359	2,415	2,473	2,532	2,593	2,655	
Ratio's														
	Hectare	Tree												
Establishment cost - capital	\$12,400	\$22.55												
Establishment cost - cash	\$7,219	\$13.13												

STRATEGIC PLAN

AUSTRALIAN WALNUT INDUSTRY ASSOCIATION (AWIA)

2008-2012

Prepared for: Australian Walnut industry Association
By: Harold H. Adem, Walnut Industry Development Manager
Department of Primary Industries, Victoria

February 2008

Vision

By 2012, the walnut industry will:

- be a profitable and environmentally sustainable industry
- produce quality walnuts that are enjoyable to eat
- meet a strongly expanding market that reflects the recognition of the walnuts great flavour and health benefits

The Australian Walnut Industry Association will support walnut producers in producing the WORLD'S BEST WALNUTS.

Mission Statement

The Australian Walnut Industry Association is the representative association of the walnut industry, formed to consolidate and progress the walnut industry in Australia. Its aim is to implement uniformity and consistency in all aspects of walnut production and marketing, be that yield, quality, cultivars, packaging, promotion or pest and disease management.

Objectives

The key objectives in Research and Development identified in the Strategic Planning workshop held at DPI, Tatura, Victoria on 17 February 2008 are:

1. To develop the yield and quality of Australian walnuts to world standards
2. To increase consumer awareness of the health benefits of walnuts
3. To adopt sustainable production systems
4. To maintain a strong industry association
5. To improve pest and disease management
6. To adopt and implement Best Practice Management in the Australian walnut industry
7. To secure funding to support Australian Walnut Industry Association project investments.

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Executive Summary

The peak body for the walnut industry in Australia is the Australian Walnut Industry Association (AWIA). With approximately 115 members from all states, most walnut growers are members of AWIA. AWIA members produce around 95% of the Australian walnut crop.

The Strategic Plan for the Australian walnut industry, for the period, 2008 – 2012, lists seven key objectives for the AWIA to address. These objectives were identified and prioritised at the Strategic Planning workshops held at DPI, Tatura, Victoria on 17 February 2008.

1. To develop the yield and quality of Australian walnuts to world standards
2. To increase consumer awareness of the health benefits of walnuts
3. To adopt sustainable production systems
4. To maintain a strong industry association
5. To improve pest and disease management
6. To adopt and implement Best Practice Management in the Australian walnut industry
7. To secure funding to support Australian Walnut Industry Association project investments.

The industry acknowledged the vital role played by the AWIA in developing the national industry.

AWIA must continue to support current and new industry to enable them to maintain both profitability and sustainability by exploring sources of funds for research and development, coordinating product promotion and facilitating the free flow of information.

Exports to Europe and Asia will allow the walnut industry to expand beyond the requirements of domestic consumption. The value of the Australian dollar and the cost of labour have a significant impact on our ability to compete with other producer countries.

The Rural Industries Research and Development Corporation (RIRDC) and Horticulture Australia Limited (HAL) have an important role to play in supporting the walnut industry in the following manner:

- Funding for research projects.
- On-going support for industry development, such as the IDM programme.
- Continued support for the Nuts for Life program to encourage increased consumption of tree nuts in general through the acceptance of the recognised health benefits of including nuts in the human diet.
- Facilitation of affordable access to pest control chemicals.
- Cross-industry programs and lobbying to ensure that suitable markets are developed.

Other organisations have a role to play in supporting the continued expansion of the walnut industry, by adopting policies that:

- Prevent the incursion of exotic diseases
- Ensure that Free Trade Agreements negotiated with our trading partners enable Australian horticultural produce to have improved access to current and new markets

AWIA will host the 6th International Walnut Symposium to be held at the RACV Club in Melbourne over 25th, 26th and 27th of February 2009.

- This prestigious, international event for walnut researchers and producers and will include a pre-symposium tour through the Riverina area of NSW and the central Murray region of Victoria.
- The symposium will focus the world's attention on the fledgling walnut industry in Australia and raise the awareness of other walnut researchers and producers of our issues, problems and potential.

Industry Situation Analysis

Walnut production offers a new and profitable industry to irrigated areas of temperate Australia. e.g. Walnuts offer farmers considerable scope for diversification from traditional, flood-irrigated pasture and some relief from drought and water reform policies. A walnut industry brings new opportunity, employment and a lower impact on the environment because less land, water, nutrients and fewer chemicals are used to generate farm income. By intensifying tree densities (>250 trees/ha) and using micro-irrigation efficiently, walnuts can achieve yields of 5-6t/ha and higher if good orchard management practices are followed. Value-adding of walnuts (kernel, oil, liqueur, pickle, paste) can increase the return per kilogram over and above farm gate prices. Other key factors in favour of walnut production are the mechanised harvest, low incidence of pest and disease problems (presently one disease, no pests) and public health benefits arising from a nut high in unsaturated fat and antioxidants.

Presently, the production of Australian walnuts is around 500 tonnes but in the next 5 years this is expected to increase to over 10,000 tonnes. In the last decade, walnut plantings have risen sharply from 500ha to around 3000ha with orchards ranging in size from 1ha to >700ha. Production is mainly in southern mainland Australia and Tasmania. Victoria has an estimated 1600ha, Tasmania 650ha, New South Wales has over 1600 ha and the balance in South Australia and Western Australia. Australia imports 96% of its annual consumption or around 8.5000 tonnes of in-shell equivalent walnuts each year but an expanded industry could supply the domestic market and export into counter-seasonal markets in the northern hemisphere.

The demographic of the walnut industry is: new entrants to the industry, corporate farms, small to medium sized commercial farms, retirement ventures and hobby farms. There is some interest in organic production.

Limits to growth:

- The availability of quality plants and hybrid rootstocks.
- The infrastructure and capital required for significant growth.
- Processing facilities.
- Underdeveloped domestic and export markets

Markets and market trends.

Australia's current production is sold within the local market, predominantly as in-shell to informed buyers who appreciate the taste and quality of fresh walnuts. Until per capita consumption in Australia increases dramatically, this market is quite limited. The other main walnut market in Australia is kernel. Almost 100% of this demand (about 8,500 tonnes of in-shell equivalent) is imported. For Australian producers to replace imports they need to compete in that market. This will require large capital investment in cracking facilities.

The other alternative for Australian producers is export. Only 1% of the world's walnut production comes from the southern hemisphere, and this comes mainly from Chile. There is a counter-seasonal opportunity for in-shell exports for a narrow window leading up to Christmas each year. This market is currently supplied from predominantly in-shell stock from the previous season, and Australian product will be fresher having been harvested only 6 months prior. The current Australian sizing standards need to be changed to accommodate the European import market for in-shell walnuts.

There are also value add opportunities for smaller volumes of walnuts, such as confectionery lines, walnut oil, pickled walnuts and walnut liqueur.

Marketing capability.

Fresh walnuts often command a premium price over most other imported walnuts. Nut quality can be inconsistent because of differences in size, appearance, taste, colour and shelf life between cultivars and at different times in the season. Harvesting walnuts at the correct stage for optimum quality and flavour will improve the consistency of product offered to the consumer. The industry requires firm guidelines about nut maturity, timely harvesting, storage and handling.

In the present market environment, all of the walnuts produced could be sold for highest returns on the domestic market.

Demand for walnuts has been enhanced by wide promotion of the health benefits of consuming walnuts. AWIA subscribes to the Australian Nut Industry Council driven Nuts For Life programme which aims at ensuring that dieticians and General Practitioners around Australia are well versed on the health benefits of nut consumption. Much of the information on health benefits has been freely available. The Australian Walnut Industry Association members have benefited from this programme through raised awareness and increased sales. AWIA also is active in promoting walnuts in particular as well as promotional activities by individual growers.

Customers.

Australian walnuts are most likely to be purchased with a use in mind eg a recipe. Lack of availability and high prices can be constraints to purchase.

In the export market, the Australian image of "clean and green" produce may enhance demand for our nut in many countries, such as Japan.

Export.

Presently, no Australian crop is exported, but this will change in the near future as production from large new plantings comes on stream.

Competitors.

Processed snack foods eg potato chips, muesli bars, chocolate are major competition for consumer purchases. Walnuts compete with other fresh nuts for the available consumer dollars spent on buying fruit, nuts and vegetables in the weekly household budget.

In the export market, existing walnut producers from the northern hemisphere already have markets in place and Australia will need to break into these markets if the perceived export opportunity is to be realised. Other southern hemisphere countries such as Chile and Argentina are emerging competitors because they have lower costs of production. Chile, Argentina and South Africa can supply walnuts to Northern Hemisphere markets during the northern off-season, as can Australia.

Products.

The Australian walnut production is principally sold as in-shell. However most of the world's trade in walnuts is in the kernel form. This will increasingly be the case as old traditions die and consumers demand a more consumer-friendly product.

There is a need to develop processes to ensure that quality control for fresh walnuts is maintained.

There may also be potential for a small Pick-Your-Own industry.

Demand for organic walnuts is increasing albeit from a very small base.

Production.

Production will increase significantly during the next 5 years as new plantings begin to bear. The biggest production increase will most likely occur in NSW, Tasmania and Victoria. As a new industry, many growers are keen to adopt industry Best Practice Management.

Generally, the majority of farmers use water and fertiliser efficiently but further improvement is needed.

There is little production data available in the public domain about the cost of production and productivity of farms. Industry statistics need to be collected via a comprehensive survey of the Australian Walnut Industry.

Supply chain.

The industry is aware of the need to maintain quality control throughout the supply chain to ensure that the nuts reach the market in premium condition.

On the domestic market, growers sell directly to corner stores, convenience stores, small supermarkets, restaurants and fruiterers, to capital city wholesale markets, and to consumers visiting their farms. The larger supermarkets are proving difficult to supply by rationalising their number of suppliers, preferring to deal with those able to supply large volumes of nuts and only wishing to purchase packaged kernel. There is also a move by supermarkets to require packaging to have generic brand labels rather than grower's identifying label.

Some growers are changing to meet these requirements by forming cooperative marketing groups. These operate either as a true cooperative, a consortium, a privately owned

company or as a company owned by a small group of growers. These cooperatives may supply both the domestic and export market.

Technology.

In Australia, there is little public investment in Research and Development for the walnut industry. The walnut industry has identified an urgent need to develop high yields of quality nuts, to remain competitive with imported walnut products.

Best Practice Management for orchards, including growing techniques, nutrition, irrigation, Integrated Pest Management, processing and harvesting needs to be documented and adopted to maximise profitability.

Easy-to-use software programs for recording production data would allow the industry to collect benchmarking data and to manage orchards to a high standard.

The Australian Walnut Industry Association website has great potential as a communication tool for disseminating Best Practice information.

People.

Industry people come from a variety of professional and agricultural backgrounds. There are new players entering the industry, some players changing from other agricultural enterprises and some are corporate investors.

Grower age and experience ranges from growers with young families seeking a lifestyle change, whilst maintaining off-farm income, to semi-retired professionals. There is a significant number of small to medium-sized commercial producers.

The industry has a wide skills base because of the varied background of producers.

There is an opportunity to encourage and support the young industry by providing suitable networking activities.

Organisation.

Most commercial producers are members of the Australian Walnut Industry Association. As with many small industries, participation on the voluntary committee needs to be encouraged and a succession plan established to support younger and new members to become involved in industry decision-making.

The current AWIA executive is very committed to the development of the organisation.

There is one paid staff member – the Industry Development Manager, based at Department of Primary Industries, Tatura, in Victoria. This is a one-day per week position. The Industry Development Manager works with, and is enthusiastically supported by, horticulturalists from the Victorian, NSW and Tasmanian Departments of Primary Industries. The Industry Development Manager reviews projects, conducts literature searches, writes papers, conducts farm walks and training workshops, in consultation with the AWIA committee.

AWIA maintains contact with its members through a well-maintained and informative website, the Australian Nutgrower and the AWIA newsletter. The Nutgrower publishes many articles of a technical nature and is a high standard publication in both design and content.

Research and Development.

The Australian Walnut Industry Association supports research and development activities. The Department of Primary Industries, through its Tatura Centre conducts research and development projects in partnership with HAL, RIRDC, agribusiness investors and AWIA.

Research work on walnuts in Australia is also conducted by Webster Walnuts in partnership with a research provider and Horticulture Australia Ltd. Most of this research has been on the main disease which effects walnut production (walnut blight), and the results have been made available to, and have benefited, the general AWIA membership.

Research and Development Projects:

Project No	Author(s)	Title	Date	Status
	Adem	Walnuts. In. 'The New Rural Industries Handbook for Farmers and Investors'. (Ed. K. Hyde). pp. 570.	1998	Published by RIRDC
Dav-73A	Adem <i>et al.</i>	(2000). High yields and early bearing for walnuts.	2000	Published by RIRDC Publication No 00/100.
NTO2005	Adem and Hilton	A study tour of the walnut industries of the USA, France and Spain. Horticulture Australia Limited.	2002	Published by HAL
NT99003	Lang <i>et al.</i>	Investigation into the control of bacterial blight in walnuts.	2003	Published by HAL
NT03001	Lang <i>et al.</i>	Sustainable management of bacterial blight in walnuts.	2004	Published by HAL
Dav-164A	Adem and Jerie	Walnut industry research & best practice implementation.	2004	Published by RIRDC Publication No 04/032.
NTO4017	Adem <i>et al.</i>	A study tour of the walnut industry in France and attendance at the 5 th International Walnut Symposium, Italy.	2005	Published by HAL
NT04013	Lang <i>et al.</i>	Sustainable management of walnut blight	2007	Published by HAL
WN06000	Follett <i>et al.</i>	Supporting the expansion of the Australian walnut industry through the micro-propagation of walnut rootstocks	2007	In progress
NTO6001	Adem	Australian walnut industry development.	2008	In progress
NT06002	Lang <i>et al.</i>	Increasing the productivity of lateral-bearing walnuts.	2008	In progress

Broader industry issues.

The high value of the Australian dollar impacts on export market profitability.

Availability and cost of farm labour are becoming an increasing problem in all regions.

Australian specifications for sizes of in-shell walnuts needs an urgent review to align with that of the European Specifications.

Limits to growth.

Sourcing the capital funding required to develop the industry to the scale it needs to achieve to become a world's best quality and lowest cost producer of walnuts.

Availability of planting stock, especially the hybrid rootstock "Paradox", is one of the greatest limitations to the expansion of the Australian Walnut industry.

Imports from lower cost producers may limit the expansion, locally, for both in-shell and kernel products.

Availability of suitable labour for harvesting and processing.

SWOT – Industry Analysis

Strengths

These will be factors that are within the control of the industry to build on and exploit.

Element	Description
Product quality	Australia has the potential for producing high quality nuts.
Production	Production can be from across the southern states and territories of Australia in a range of geographic locations. Small acreages can be viable, so long as they have reasonable access to harvesting and processing facilities.
Pest and disease	Few walnut pests and diseases in Australia.
Export potential	Southern hemisphere production (off-season to northern hemisphere markets).
Domestic market growth	Potential demand outstripping supply.
Marketing opportunities	Snack food, convenience food. Value-added health products. Cooperative marketing.
Australian owned	Most are Australian-owned businesses.
Young industry	In rapid growth phase. Able to set the quality standards and best practice guidelines for the industry as a whole. Working together.
Profitability	Profitability still good – maintaining margins.
Industry association (AWIA)	Most belong to AWIA. A cohesive industry. Good services – website, newsletter, library, meetings, workshops, farm walks. Well resourced members – broad skills base - enables future IDM appointed.

Weaknesses

Weaknesses are generally problems within the industry that can be addressed to improve the overall position.

Element	Description
Cultivars	Do not have good access to hybrid rootstocks and some cultivars.
Research & Development	Little investment in R&D for the Australian walnut industry. Lack of knowledge of information sources.
Funding	Limited industry funds to support large R& D programs. Limited industry funds to support marketing and promotion.
Product quality	Inconsistent quality standards. Need for industry accepted product quality standards.
Consumer awareness	Need to increase consumer knowledge of the benefits of walnuts – health and nutritional value.
Pests and Diseases	Improved control of Walnut Blight. Management of exotic incursions. Weed management.
Chemicals	Difficulty in accessing registered chemicals for Minor Use crops.
Marketing	Need to expand new markets for the increased production of nuts.
Operating costs	A medium to high-input crop, with establishment and input costs of particular concern.
Cost to consumer	Perceived high purchase cost compared with some other nuts.
Industry association (AWIA)	Communication - membership geographically dispersed. Limited resources – funds and paid staff. Limited influence with the government because industry is small. Perception of big grower / little grower issues. Perception that association is Victoria centric. Acknowledgement of different issues in different states.

Threats

Threats are generally external influences over which industry itself has no control, though could take some action to reduce their impact.

Element	Description
Cultivars	Future new cultivars may be restricted by costs imposed by Plant Breeder's Rights.
Diseases	Biosecurity issues from exotic pests and diseases.
Imports	Competition from countries with low costs of production.
International trade	Future Free Trade Agreements. Competition from other countries.
Competition	Competition from other nut crops. Supermarket dominance. Consumer preferences for unhealthy snack foods.
Chemicals issues	Market impacts from misuse of chemicals. Community misunderstanding about safe pesticide use.
Quality control	Poor quality nut jeopardises consumer confidence in a good eating experience.
Genetically Modified Organisms	Public perception of GM crops.
Water	Uncertainty of supply and quality. Salinity and sodicity. Impact of climate change.
Weather	More frequent and severe storm events. Frost, hail and sunburn damage to crops.
Labour costs	Regulatory increases within the wage system.
Labour availability	Shortage of qualified horticulturalists and skilled labour. Competition for labour from other horticultural industries.
Industry organisation	Informal, voluntary and time poor, need for better direction and cooperation.
Industry association (AWIA)	Committee composed of volunteers. Maintaining relevance of AWIA to members - diverse interests of industry make it difficult to support all members' needs. Members lack of commitment to AWIA. Few political connections to professional farming bodies and government. Difficulty managing the needs of large and small growers.

Opportunities

Opportunities are external factors that would be beneficial for the industry to capitalise on.

Element	Description
Domestic market	Demand is expanding rapidly. Potential to market by special attributes (boutique products).
Export market	Demand is increasing. Northern hemisphere increased production creates a market for Australia to fill in the off-season.
Health benefits/ consumer benefits	Effective promotion can increase consumption. Consumers becoming more health conscious. Increased research into health benefits. Consistently enjoyable eating experience.
Local supply potential	New growing regions expand the potential to have fresh product available locally.
Australian cultivars	None yet selected for local conditions, producing consistent yields and quality.
Value-adding	Potential for a wide range of walnut products. Increasing demand for processed products. Means of coping with excess product.
Organic production	Increasing consumer demand.
Grower cooperation	Marketing groups. Sharing of technical knowledge and experience.
Industry association (AWIA)	Collective Research and Development (R&D) and promotional opportunities as a group. Marketing & information sharing, including with other nut groups through cross commodity membership. Work with Supermarkets – cooperation and marketing: <ul style="list-style-type: none"> • Code of Practice • Quality standards Sourcing funds - statutory levy for R&D and Promotion. Further industry development. Lobbying local, state and federal governments.

Major Issues Prioritised

At the R&D Planning Workshop held 17 February 2008, the following topics were discussed:

Priorities for Action

(Topics in bold have detailed notes from the discussion in the following sections of the report)

Priorities for Research & Development
Information, resources & links on AWIA website
Identify funding sources for research
Find out best practices for drip irrigation subsurface installation existing research
Walnut genetics reconnaissance for good performance trees
Creation of walnut industry standards
Establish marketing authority
Single look export authority
Root stock trial program
Development of root stock repository in different locations
Establish a research block to determine the water & nutrition mechanisms of walnut trees in Australian conditions to achieve industry best practise
A survey of tree water status in commercial walnut orchards
Blight management understanding – optimum spray times
Walnut blight – development & validation of a decision support tool for timing copper sprays, for when the pathogen is active and according to crop stage
Research alternatives to copper sprays for blight.
Elimination of and adoption of methods of increasing pollen availability in young orchards
Sizing research to satisfy industry requirements & to meet future international standards

Vision

By 2012, the walnut industry will:

- be a profitable, environmentally sustainable industry.
- produce enhanced quality walnuts that are enjoyable to eat.
- develop new market opportunities both nationally and internationally

The Australian Walnut Industry Association will support all walnut industry in growing
WORLD CLASS WALNUTS.

Mission Statement

The Australian Walnut Industry Association is the representative association of walnut industry, formed to consolidate and progress the walnut industry in Australia. Its aim is to implement uniformity and consistency in all aspects of walnut production and marketing, be that yield, quality, cultivars, packaging, promotion or pest and disease management.

Objectives

The key objectives identified from the AWIA Strategic Planning workshop were:

- Establish a single desk authority for domestic and export marketing
- Introduce superior root stocks to the industry
- Determine industry best practice levels of water & nutrition for walnut trees under Australian conditions.
- Survey tree water status in walnut orchards to improve irrigation scheduling
- Develop a decision support tool and alternatives to copper sprays for the control of walnut blight.
- Improve pollen availability in young orchards
- Review standards of size and quality for in-shell walnuts

Strategies & Action Plan for 2008 & 2012

1. Research & Development Priority: Adopt software for making decisions on managing walnut blight including choice of chemical, crop stage and weather.

Session Initiator: Helene Bell
Evans, Pat Spinks, and Phil Dodd

Participants: Marta Chiba, Kathy

What needs to happen?	Champion - who will take the lead?	Partners - who do we need to work with?
Gain an understanding of current research and those involved. This will cover <ul style="list-style-type: none"> ◆ reducing Cu sprays ◆ developing alternative sprays ◆ developing software program 	Marta Chiba	Engage Monash University to do literature search.
Formulate a research proposal concept. Form group – get contact details: email, phone Seek approval from AWIA to support funding	Helene Bell	Form a team of interested researchers and growers to develop proposals concept.
Seek potential funding bodies and develop the full proposal. In the research proposal it will identify the collaborations or potential partners.	Marta Chiba	Interested researcher. Potential funding bodies E.g. HAL, Australian Research Council linkage with industry Australian industry.

2. Research & Development Priority: Establish a single desk marketing authority

Session Initiator: Paul Schaefer

Participants: Rob Atkins

What needs to happen?	Champion - who will take the lead?	Partners - who do we need to work with?
Marketing authority established – both local and export. Look at “best practice” of other successful industries	AWIA	Alberto Valier (Italy) Almond Co. etc.
Quality control Coordination of marketing Long term relationships Reduction of cost (no duplication)		

3. Research & Development Priority: Optimise growth of walnut trees to achieve industry best practice under Australian conditions.

Session Initiator: Graham Fellows
Margaret Fitzgerald

Participants: Chris Bell, Colin Jack,

What needs to happen?	Champion - who will take the lead?	Partners - who do we need to work with?
<ul style="list-style-type: none"> ◆ Long term research project. Block or blocks. ◆ Identify location or locations. ◆ Typical inland temperate environment ◆ Scientists and scientific research establishment facilities ◆ Source funding 	<p>Graham Fellows to contact UWS walnut project. Colin Jack to contact David McNeil Chris Bell follow up on earlier Australian Research Margaret Fitzgerald to search funding sources.</p>	

4. Research & Development Priority: Monitor Midday Stem Water Potential and soil water suction to improve irrigation scheduling.

Session Initiator: Harold Adem

Participants: Bruce Leslie, Pat Fitzgerald

What needs to happen? Measurements	Champion - who will take the lead?	Partners - who do we need to work with?
Survey of tree water status between and within walnut orchards	Harold Adem	Local walnut orchardists willing to participate in survey
Monitoring of Midday Stem Water Potential and adjacent soil water availability within individual orchards	Harold Adem	Industry orchard leaders who may be able to share existing information and techniques.
Diurnal variation of water stress levels (>10 BAR) noted between individual trees and orchards		
Follow up measurements after irrigation and fine tuning to reduce tree stress as measured by Midday Stem Water Potential (Aim for 5 – 6 BAR)		

5. Research & Development Priority: Introduce superior rootstocks (variety, vigour, suitability) and develop a rootstock repository in different locations

Session Initiator: Bryan Goble

Participants: Jennifer Wilkinson, Mark Jankelson

What needs to happen?	Champion - who will take the lead?	Partners - who do we need to work with?
Research current studies on rootstock performance to inform design of project	AWIA scientific committee	Researcher (UNIV) Horticultural Institutions, Universities, AWIA scientific committee, websites other plant specialist organisations
Identify sources of material – seed, vegetative matter	AWIA scientific committee	As per above, plus nurseries and other plant repositories. Legal obligations (PBR< AQUIS), AWIA scientific committee
Identify genetics of mother trees that have shown superior and suitable performance characteristics in Australia.	AWIA scientific committee	Researchers, plant pathology, IDM, site managers, lawyers, AWIA scientific Committee.
Establishment of a number of mother tree locations for parent material	AWIA scientific committee	As above
After assessment of rootstock performance, establish repository for supply of commercial rootstock material.	AWIA scientific committee	As per above

6. Research & Development Priority: Review standards for walnut size and quality

Session Initiator: Tony Parisi
Wilkinson

Participants: Alan Kubeil, Jim Spinks, Norm

What needs to happen?	Champion - who will take the lead?	Partners - who do we need to work with?
Identify appropriateness of existing sizing and colour standards to meet market demands and to set new standards.	Tony Parisi	Retailers The Australian Walnut Industry Association Producers Processors Consumers Overseas Buyers.
Assess suitability of terminology of sizes	Research project	Market Research Consumers
Research into the ability of various sizing mechanisms (round hold, bar roller) to produce a consistent sized product to meet market demand or standards.		Producers and Processors Industry
<ul style="list-style-type: none"> ◆ undertaken within 12 months (low cost) ◆ Cooperation between industry groups. 		

7. Research & Development Priority: Examine and adopt methods of increasing pollen availability in young orchards

Session Initiator: Leigh Titmus

Participants: Hilary Jankelson, Bill

Andrianopoulos, Mike Burston, Barry McGrath, Amy Symons

What needs to happen?	Champion - who will take the lead?	Partners - who do we need to work with?
Desktop research into methods of increasing catkin development and/or pollen availability	Leigh Titmus	Bill Andrianopoulos
Survey of walnut growers regarding catkin development in their orchards. (using info from above) Coordinate with other surveys	Hilary Jenkelson	AWIA members Statistician
Using results from the survey and desktop research, develop a protocol for increasing pollen availability	Leigh Titmus	
<ul style="list-style-type: none"> ◆ Members adopt the protocol and enter data obtained into a software package made available on website 	Barry McGrath	David Woodcock

Financial Plan

The Australian Walnut Industry Association manages its program commitments within its budget. Income is currently obtained from membership fees and voluntary contributions, both monetary and in-kind.

Commitments to the above Action Plan will depend on availability of resources and the success of obtaining industry endorsement for a Voluntary Levy.