



Australian Government
Rural Industries Research and
Development Corporation

Honeybee RD&E Plan 2012–2017



RIRDC Shaping the future

RIRDC Corporate Plan 2012-2017 – Summary

VISION

Enhanced prosperity for Australian rural industries and their communities

PURPOSE

To invest in research and development that is adopted and assists rural industries to be productive, profitable and sustainable

GOALS

Promote leadership and innovation in the rural sector

Increase profit and productivity in rural industries

Enhance sustainability across the rural sector

STRATEGIES

Deliver analysis on issues of national importance to the rural sector and broader community

Assess the feasibility, value and potential competitiveness of new plant and animal industry opportunities

Encourage research that fosters science and industry creativity

Manage demand driven RD&E that meets industry needs

Facilitate investments that deliver economic social and environmental benefits for rural industries

Adopt a life-cycle approach to investment in new, developing and established industries

Work collaboratively on cross sector issues that impact across industries

Increase knowledge about rural industry options that offer regional economic development opportunities

Encourage the sustainable use and management of natural resources

Promote leadership, capacity, skills and pathways that create opportunities

OUTCOME

Increased knowledge that fosters sustainable, productive new and existing rural industries and furthers understanding of national rural issues through research and development in government-industry partnership.



Australian Government

**Rural Industries Research and
Development Corporation**

Honeybee RD&E Plan

2012 to 2017

June 2012

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Foreword

Five year research, development and extension (RD&E) plans are developed for each of RIRDC's major programs. This 2012-2017 RD&E Plan is the sixth plan for the Honeybee Program. Honeybee research has developed progressively since the mid 1980s. Each of the previous plans, 1986-91, 1991-96, 1996-2001, 2002-07 and 2007-2012 reflected the priorities of the Australian honeybee industry at their time of development and this plan builds on their achievements.

The RIRDC project, *Economic Evaluation of Investment in the Honeybee R&D Program including the Pollination Sub-program* published in 2012 assessed three clusters of investment made under the 2007-2012 Honeybee R&D Plan. The analyses found each of the three investments provided positive returns with benefit-cost ratios ranging from 2.05 to 28.61.

The 2012-2017 Plan identifies four key objectives for the RD&E investments to be made on behalf of the industry and Australian Government. Associated with each objective is a set of strategies to be followed in pursuing each objective and a set of performance indicators to give guidance as to how the program can be assessed as it progresses. An indicative share of RD&E budget has also been proposed for each plan objective in order to guide investment priorities.

This Plan has been prepared in consultation with RIRDC's Honeybee Program Advisory Committee and the Australian Honey Industry Council.

This Plan aims to assist the industry to build and develop its future.

Craig Burns

Managing Director

Rural Industries Research and Development Corporation

Snapshot of the Five Year Plan

Vision

Our vision is for a productive, sustainable and more profitable Australian beekeeping industry.

Mission

Our mission is to manage investment in RD&E that will:

- Assist the industry to ensure the health of managed European honeybees
- Assist the industry to manage European honeybees using sustainable methods to be more productive and increase beekeepers' profitability

Objectives

The following objectives drive RD&E investment in the 2012-2017 RD&E program (indicate target investment levels as a proportion of total investment are shown).

1. Reduce the incidence and impact of pests and diseases on honeybees (45%);
2. Increase the productivity and profitability of beekeepers (20%);
3. Increase understanding of the role of flora in honeybee management (20%);
4. Promote extension, communication and capacity building (15%).

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1. Introduction

This five-year research, development and extension (RD&E) plan for Australia's honeybee industry builds on the previous plans with a focus on areas of RD&E that are of greatest potential value to the industry and where there are capabilities to provide high quality RD&E.

RIRDC has an associated RD&E plan for the Pollination Program (RIRDC 2011). The Pollination Program is a jointly funded program between the RIRDC Honeybee Program and Horticulture Australia Ltd.

Alignment with Government and RIRDC priorities

Table 1.1 indicates the alignment of the Program's objectives, RIRDC's relevant Strategy and the Government's Rural Research Priorities and National Research Priorities.

Preparation of the Plan

The RD&E plan was developed in consultation with the Australian Honey Bee Industry Council (AHBIC) and members of the RIRDC Honeybee RD&E Advisory Committee.

Preparation of the plan involved discussion with stakeholders of the current and future issues facing the industry and the role of RD&E in addressing these issues. State apiarists associations were encouraged at their 2011 conferences to provide input through AHBIC.

A draft plan was developed by the Senior Program Manager, Dr Dave Alden, with input from AHBIC and the Honeybee Advisory Committee. AHBIC endorsed the draft plan and the Advisory Committee recommended the final draft plan to the RIRDC Board for approval.

Table 1.1 Alignment of Program objectives with RIRDC strategy and Government research priorities

National Research Priorities	Rural Research Priorities	RIRDC Strategies	Program Objectives
Promoting and maintaining good health	Productivity and adding value	<p>Manage demand driven RD&E that meets industry needs</p> <p>Facilitate investments that deliver economic, social and environmental benefits for rural industries</p> <p>Increase knowledge about rural industry development options that offer regional economic development opportunities</p> <p>Adopt a lifecycle approach to investment in new, developing and established industries</p>	<p>Objective 1: Reduce the incidence and impact of pests and diseases on honeybees</p> <p>Objective 2: Increase the productivity and profitability of beekeepers</p>
	Supply chain and markets	<p>Deliver analysis on issues of national importance to the rural sector and broader community</p> <p>Assess the feasibility, value and potential competitiveness of new plant and animal industry opportunities</p>	
An environmentally sustainable Australia	Natural resource management	Encourage the sustainable use and management of natural resources	Objective 3: Increase understanding of the role of flora in honeybee management
	Climate variability and climate change	Work collaboratively on cross sector issues that impact across industries	
Safeguarding Australia	Biosecurity	Work collaboratively on cross sector issues that impact across industries	Objective 1: Reduce the incidence and impact of pests and diseases on honeybees
Frontier technologies for building and transforming Australian industries	Innovation skills	Promote leadership, capacity, skills and pathways that create opportunities	Objective 4: Promote extension, communication and capacity building
	Technology	Encourage research that fosters science and creativity	Objective 1: Reduce the incidence and impact of pests and diseases on honeybees

2. Industry Profile

The following profile of the Australian honeybee industry was sourced from ‘*Future Directions for the Australian Honeybee Industry*’ a report prepared by the Centre for International Economics (CIE 2005) with funding from the Australian Government Department of Agriculture Fisheries and Forestry (DAFF) Industry Partnership Programme unless otherwise stated. Information has been updated, where available.

The Australian honeybee industry produces between 20,000 and 30,000 tonnes of honey annually. The estimated production in 2008 was 21,000 tonnes (Kneebone 2010). Other honeybee products include paid pollination services, beeswax production, queen bee and packaged bee sales, pollen, bee venom¹ and propolis². The industry has an overall estimated gross value of production (GVP) of \$90 million a year.

The relatively small honeybee GVP understates the industry’s value to agriculture and the economy in general through pollination services and, potentially, the value of honey and honey products in medical uses. Pollination services have previously been estimated as contributing around \$1.7 billion annually to the Australian economy (Gordon and Davis 2003).

The main honey production period is from October to March. All honey is colour classified according to an international system and although prices have generally increased as the colour decreases from dark to amber through to white, there is a move towards a more extensive grading system that also evaluates presentation, moisture, taste and freedom from contamination (RIRDC 2002).

There are approximately 9,600 registered beekeepers in Australia with around 500,000 hives. However, over 70% of hives are operated by commercial beekeepers with more than 200 hives. Most commercial apiarists operate between 400-800 hives but some have more than 3,000 hives.

Approximately 70% of Australian honey is produced from native flora. This requirement for native flora highlights the dependence of Australian beekeeping on public and private land. About half the accessible apiary sites in native forests are on private land and half on public land. Access to native flora on public land has declined over time.

NSW is home to 33% of Australian apiarists, Queensland 31%, Victoria 15%, Western Australia 10%, South Australia 8% and Tasmania 3% (Rodriguez *et al* 2003).

About a third of honey produced in Australia is exported and directed to over 38 countries. Key export markets include the United Kingdom, Indonesia, North America

¹ Bee venom is traditionally used in natural medicine for various kinds of rheumatism and other medical conditions. Western countries are also known to use it as an alternative to heavy drug use for some ailments.

² A resinous substance gathered by honeybees from tree bark and leaves. It is a sticky material that bees use to seal holes and cracks in their hive. Propolis reportedly has antibiotic, antioxidant, and antiviral properties. There are very few if any propolis producers in Australia.

and Saudi Arabia. Most Australian honey is exported in bulk form (3,510 tonnes in 2008), but there is a significant and increasing proportion of exports shipped as retail packs (4,290 tonnes in 2008) (Kneebone 2010).

Generally honey import volumes are quite small but rose to 9,000 tonnes in 2003 when there was a drought induced shortage of Australian honey. Honey imports in 2008 were 4,411 tonnes (Kneebone 2010). Australian honey is mostly high quality and commands a significant premium over honey from other countries.

The drought in Australia throughout the 2000s coincided with high international honey prices, resulting in substantial increases in wholesale prices in Australia. These prices have now declined. Consumption of honey has followed an inverse relationship to honey prices. Australian consumers readily substitute other spreads for honey.

In recent years honey packers have increased their imports of honey to produce blended honey.

Queen bee breeding is specialised and there are growing markets, especially in North America, for Australian queen and package bees. This sector of the industry is relatively profitable and there are good prospects for expansion — the major constraint is the number of skilled queen bee breeders, freight costs and the high Australian dollar.

There is also a growing market for pollination services, especially with the expansion of the almond industry centred in South Australia and Victoria that use approximately 100,000 hives to pollinate the crop.

3. Key Industry Challenges

The SWOT analysis

The following analysis is based on the previous plan and has been updated where necessary.

Strengths	Weaknesses
<p>Skills, enthusiasm and mobility of commercial beekeepers (perhaps the industry's greatest strengths)</p> <p>Australia is free from Varroa mite</p> <p>Australia has diverse flora</p> <p>The industry has a reasonable organisational structure</p> <p>Reputation for high quality product; some good brands have been established</p> <p>Some honey and honey products have medicinal uses that can be better exploited</p> <p>Through pollination services, the industry provides major benefits to the rest of agriculture; there is strong demand for these services</p> <p>Industry has a good quality assurance program; however, more beekeepers need to adopt this</p> <p>Australia has good research capacity, with several highly skilled researchers, but young researchers need to be encouraged</p>	<p>The spread of Asian honey bees from Cairns is likely to have a negative impact on the management of European honeybees</p> <p>Public relations between beekeepers and the public, and with land managers could be improved</p> <p>The industry lacks dynamics in selling its 'good story' image to the public and policy makers</p> <p>Some beekeepers are not vigilant in controlling endemic diseases, especially American foulbrood (AFB)</p> <p>State governments are reducing their involvement with endemic diseases control shifting this responsibility to industry which has limited capabilities in this area</p> <p>The high mobility of the industry is conducive to the rapid spread of pests and diseases</p> <p>Hive productivity is not as high as it could be.</p> <p>There is scope for greater adoption of best management practices and research results</p> <p>International food safety authorities are preparing an assessment to determine whether to decrease the level of pyrrolizidine alkaloids (PAs) allowable in food which could increase the cost of honey production</p> <p>The industry's workforce is 'ageing'. Not many young people are attracted into the industry, and there is some reluctance to pass on skills in a formal way</p> <p>There is a lack of standards that are adhered to in provision of professional pollination services</p> <p>The industry is having difficulties in enhancing the supply of queen bees to meet growing demand</p> <p>Industry cohesion and cooperation is not as strong as it could be</p> <p>Some countries that were importing queen bees and packaged bees from Australia have recently banned their importation because of concerns about these bees being vectors for pests and diseases</p>

Opportunities

Ensure everything possible is done to protect the industry from an exotic incursion of Varroa mite or other exotic pests (eg Asian honey bee) or diseases

Develop advice for government, based on research, to inform decisions about access to native flora resources

Develop advice, based on research about PAs, that could be used to influence deliberations by international food safety authorities about the allowable level of PAs in food.

Identify production cost reduction opportunities for industry

Improve hive management to; increase productivity; reduce the risk of bee pests/disease being spread; reduce the risk of contamination of honey by chemicals/antibiotics; and ensure appropriate quality assurance (QA)

Inform industry about appropriate environmental management systems (EMS)

Increase supplies to meet demand for honey bee products particularly in queen bees and pollination (especially for the expanding almond production)

Maintain/enhance reputation as a supplier of top grade honey which is clean green and commands a premium i.e. brands

Increase exports of branded honey in retail pack form and sell less in bulk form

Identify whether specific floral honeys have specific qualities/properties that could command a premium price

Education and training needs analysis, standards establishment and industry branding

Threats

An incursion of Varroa mite or other serious exotic pest would be likely to have significant cost impacts on the industry and is considered the major threat to the industry

Production is 70% reliant on native flora and there has been a strong trend in declining access as the resource has been harvested by the timber industry or moved into conservation. The industry's scope for alternatives is somewhat limited (major industry threat)

Spread of AFB through bad hive management and state government agencies withdrawing resources from enforcing state legislation and regulations which aim at controlling AFB

Greater inappropriate use of antibiotics and chemicals to control foulbrood diseases could cause contamination and severely tarnish Australia's 'clean green' image

Beekeepers' image in managing environmental issues could be tarnished unless the industry adopts EMS

Threat of exotic incursions from some beekeepers illicitly importing material

Rising fuel prices will affect profitability

Loss of skills and talent as current generation of beekeepers and researchers retire

4. Industry Commitment

The Australian honeybee industry is strongly committed to, and supportive of the investment in, RD&E through the Honeybee Program and the Pollination Program.

The honeybee industry actively contributes to setting the direction of, and determining the level of investment in, RD&E activities in the Honeybee Program and the Pollination Program. Industry input is primarily provided by AHBIC, through consultation with state industry associations.

The honeybee industry contributes funds to the Honeybee Program primarily through statutory levies. The research and development component of these levies are provided to RIRDC for expenditure within the Honeybee Program. The Australian Government matches expenditure from the Program, up to 0.5% of the gross value of production of the honeybee industry.

Levies are payable on honey and honeybee queen bees produced in Australia and sold in Australia, or exported. Specific and up-to-date information about levies are to be found on the Department of Agriculture, Fisheries and Forestry (DAFF) website (www.daff.gov.au/levies).

A levy is payable on honey to provide funding for research and development and residue testing programs. These programs are administrated by RIRDC and the National Residue Survey (NRS) respectively. The DAFF Levies Revenue Service receives the funds and forwards them to RIRDC and NRS. A small portion of the levy is paid to the Emergency Animal Disease Response fund, allowing a reserve of money to build up that will be used in the event of a disease outbreak which could threaten the prosperity of the industry.

The levy on honey is 2.3 cents per kilogram of honey sold. Levy is not payable on honey sold in a year if the total weight of honey sold is not more than 600 kilograms. RIRDC's Honeybee Program receives 1.5 cents per kilogram of honey from the Levy Revenue Service.

The levy for queen bees sold at \$20 and under is 0.5% of sale price and the levy on queen bees sold for over \$20 is 10 cents per queen sold. If a queen bee is sold as part of a transaction and the price for the queen bee is not separately determined, the queen bee is taken to have been sold for \$9.00. Levy is not payable on queen bees if, in a levy (financial) year, the total amount of levy the producer is liable to pay for queen bees is less than \$50.

Voluntary industry contributions are also, on occasions, made to the Honeybee Program. For example, in late 2011 the AHBIC arranged for \$400,000 of funds to be provided over two years from the Federal Council of Australian Apiarists Associations and funds from the Emergency Animal Disease Response fund for specific RD&E activities to support the *Plan for Transition to Management of the Asian Honey Bee*.

5. Research Directions

To guide the direction for the 2012-2017 Plan, the following analysis of the previous Plan was undertaken and is reported below. The analysis was prepared with input from, and endorsed by, the Australian Honeybee Industry Council.

Performance Review of the 2007-2012 R&D Plan

The goal and objectives of the 2007-2012 Honeybee R&D Plan are set out below.

Goal

To improve the productivity, sustainability and profitability of the Australian beekeeping industry through the organisation, funding and management of a research, development and extension program that is both stakeholder and market focussed.

Objectives

Objectives that drove investment in the 2007-2012 R&D program, along with expected share of the program budget, are set out below.

1. *Pest and disease protection* – to be prepared for exotic pest and disease incursion before it occurs; to prevent the establishment of exotic pests and diseases of economic significance; and to control endemic pests and diseases that impact on beekeeper profitability (45%);
2. *Productivity and profitability enhancement to lift beekeeper income* – to encourage a culture of constant improvement in bee husbandry and management; to provide an across the board lift to industry productivity and profitability; and to focus productivity improvement on bee genetics, best management practices, beekeeper efficiencies and industry benchmarking (15%);
3. *Resource access security and knowledge* – to ensure ongoing access to native forests on public lands; to win back a share of native forest access lost in previous resource allocation decisions; to better understand the native floral resource on which the industry depends; and to address the implications of climate change on the Australian apiary industry (10%);
4. *Pollination research* – to better understand the cost and value of pollination services provided by beekeepers; and to generate industry value through shared learning with crop producers, especially the Australian almond industry (10%);
5. *Income diversification including new product development* – to provide a major boost to packaged bee sales, an area of strong competitive advantage for the Australian industry; and to develop new Australian apiary products which represent secondary niche opportunities (10%); and
6. *Extension, communication and capacity building* – to improve industry performance through the adoption of relevant R&D project outcomes and beekeeper participation in vocational training; to educate the public and policy makers on the economic contribution made by the honeybee industry; and to build capacity in the Australian honeybee industry by encouraging the next generation of industry leaders and researchers (10%).

These objectives were to be regarded as complementary, with flexible boundaries to enable key issues to be addressed either simultaneously or sequentially through several components of the program. The Program budget allocations were flexible and were guided by the Honeybee Advisory Committee.

Pollination Program R&D Plan 2009-2014

In partnership with a number of horticultural industries within Horticulture Australia Ltd, the Pollination Program was developed, in part, to fund projects consistent with the 'Pollination research' objective in the 2007-2012 Honeybee R&D Plan. RIRDC's funding contribution to the Pollination Program has been \$100,000 per year, allocated from the Honeybee Program.

The goal and objectives of the 2009-2014 Pollination Program are set out below.

Goal

To support research, development and extension activities that will secure the pollination of Australia's horticultural and agricultural crops into the future on a sustainable and profitable basis.

Objectives

Plan objectives that underpin the 2009-2014 R&D Program, with anticipated shares of the annual Program budget are:

1. Incursion risk minimisation – for early detection of a threat to pollination service supply; (10%)
2. Improving the effectiveness and economic return from pollination – living with Varroa; (20%)
3. Resource access – landscape and nutrient management for effective pollination; (10%)
4. Pest and disease management – to ensure the ongoing supply of pollination services; (45%)
5. Reducing crop dependence on honeybees – native pollinators and self-pollinating crops; (5%)
6. Communication – including pollination education, extension and capacity building. (10%).

RIRDC expects the Pollination Program to continue following the end of the 2009-2014 Pollination Program R&D Plan.

AHBIC's assessment of the value of the Program projects published since July 2007

From the perspective of the honeybee industry, the Australian Honey Bee Industry Council assessed the value of the 31 projects below, from which reports were published during the life of the previous Plan (see Table 5.1). The assessment of the benefits of the project to beekeepers were included in the benefits accrued to date, plus those that are likely to flow to beekeepers into the future. For each project, AHBIC assessed benefits as either: high (H), medium (M) or low (L).

Table 5.1 AHBIC assessment of value of Program projects published since July 2007

Project Name	Web link to report (Press 'Ctrl + click')	Principal Investigator	H	M	L
Analysis of the market for pollination services in Australia	https://rirdc.infoservices.com.au/items/08-058	Jenny Gordon			X
A study of New Zealand beekeeping – lessons for Australia	https://rirdc.infoservices.com.au/items/08-060	Doug Somerville		X	
Sustainable control of small hive beetle through targeting in-ground stages	https://rirdc.infoservices.com.au/items/08-115	Robert Spooner-Hart			X
Pollination Australia - Comprehensive Risk Management Strategy Consultancy	https://rirdc.infoservices.com.au/items/08-054	Rob Keogh		X	
Pollination Australia - Education and Training Needs Consultancy	https://rirdc.infoservices.com.au/items/08-059	David Brous		X	
Drone honey bees - semen production	https://rirdc.infoservices.com.au/items/08-130	John Rhodes			X
Development of two genetic markers for hygienic behaviour of honeybees	https://rirdc.infoservices.com.au/items/08-092	Ben Oldroyd	X		
Does Nosema ceranae infect bees and contaminate honey in Australia?	https://rirdc.infoservices.com.au/items/08-133	Michael Hornitzky	X		
Securing long-term floral resources for the honeybee industry	https://rirdc.infoservices.com.au/items/08-087	David Paton		X	
Long-term flowering patterns of south-east Australian melliferous flora	https://rirdc.infoservices.com.au/items/08-098	Maria Gibson			X
Honey Industry Survey 2006/07	https://rirdc.infoservices.com.au/items/08-170	Milly Lubulwa	X		
Investigate the value added potential of the prebiotic components of Australian honeys	https://rirdc.infoservices.com.au/items/09-179	Patricia Conway		X	
An investigation into the therapeutic properties of honey	https://rirdc.infoservices.com.au/items/09-180	Dee Carter		X	

Project Name	Web link to report (Press 'Ctrl + click')	Principal Investigator	H	M	L
Feasibility study into in-hive fungal bio-control of small hive beetle	https://rirdc.infoservices.com.au/items/09-090	Diana Leemon	X		
Development of treatment options for European foulbrood	https://rirdc.infoservices.com.au/items/10-012	Michael Hornitzky		X	
Biological control of chalkbrood by anti-fungal bacterial symbionts of bees	https://rirdc.infoservices.com.au/items/09-120	Murali Nayudu		X	
Evaluation of anti-Varroa boards for increase in honey production	https://rirdc.infoservices.com.au/items/10-011	Robert Spooner-Hart			X
Forest plantations and honeybees	https://rirdc.infoservices.com.au/items/10-076	Doug Somerville		X	
Tasmanian Floral Data Base	https://rirdc.infoservices.com.au/items/09-153 and https://rirdc.infoservices.com.au/items/09-149	Mark Leech		X	
Australian Honey: Expanding the market for a multifunctional, natural food	https://rirdc.infoservices.com.au/items/10-145	Martin Kneebone		X	
Cost-benefit analysis of the effects of Apis cerana	https://rirdc.infoservices.com.au/items/10-026	Terry Ryan	X		
Simulation Exercise for Pollination Industries	https://rirdc.infoservices.com.au/items/10-070	Rodney Turner	X		
Future Surveillance needs for Bee Biosecurity	https://rirdc.infoservices.com.au/items/10-107	Simon Barry	X		
Pollination Aware: Its Importance to Australia 35 case study crop reports were also produced eg. Cherry	https://rirdc.infoservices.com.au/items/10-081 https://rirdc.infoservices.com.au/items/10-115	Rob Keogh	X X		
Hygienic behaviour of the Western Australian bee breeding program	https://rirdc.infoservices.com.au/items/10-144	Robert Manning		X	
Assessment of a hive based levy for the Australian honeybee industry	https://rirdc.infoservices.com.au/items/10-143	Robert Granger		X	
Rapid method for measuring the antimicrobial activity of honey	https://rirdc.infoservices.com.au/items/11-014	John Black		X	
Small hive beetle biology providing control options	https://rirdc.infoservices.com.au/items/11-044	Nicholas Annand	X		
A study of Nosema ceranae in Australia	https://rirdc.infoservices.com.au/items/11-045	Michael Hornitzky	X		
Pollination Program communication strategy	See media releases at bottom of the link below http://www.rirdc.gov.au/programs/established-rural-industries/pollination/pollina	Kaaren Latham	X		

Project Name	Web link to report (Press 'Ctrl + click')	Principal Investigator	H	M	L
	tion_home.cfm				
Non-chemical and minimum chemical use options for management of Varroa – workshop report	https://rirdc.infoservices.com.au/items/10-201	Michael Williams	X		

Economic Evaluation of Investment in the 2007-2012 Honeybee R&D Program including the Pollination Sub-program

The RIRDC project, *Economic Evaluation of Investment in the Honeybee R&D Program including the Pollination Sub-program* published in 2012 assessed three clusters of investment made under the 2007-2012 Honeybee R&D Plan.

The projects evaluated demonstrated a wide range of predominantly economic benefits, a number of which were quantified in value terms. Funding for the three projects analysed totalled \$0.79 million (present value terms) and produced aggregate total benefits of \$4.71 million (present value terms). The analyses found each of the three investments provided positive returns with benefit-cost ratios ranging from 2.05 to 28.61.

6. The RD&E Program 2012-17

The Honeybee Program's vision, mission and objectives, strategies and performance indicators for 2012-17 reflect those for the previous Plan, as they continue to be relevant.

Vision

Our vision is for a productive, sustainable and more profitable Australian beekeeping industry.

Mission

Our mission is to manage investment in RD&E that will:

- Assist the industry ensure the health of managed European honeybees
- Assist the industry manage European honeybees using sustainable methods to be more productive and increase beekeepers profitability

Objectives

The following objectives drive RD&E investment in the 2012-2017 RD&E program (indicate target investment levels as a proportion of total investment are shown).

1. Reduce the incidence and impact of pests and diseases on honeybees (45%);
2. Increase the productivity and profitability of beekeepers (20%);
3. Increase understanding of the role of flora in honeybee management (20%);
4. Promote extension, communication and capacity building (15%).

Objectives should be regarded as complementary, with flexible boundaries to enable key issues to be addressed either simultaneously or sequentially through several components of the program.

Strategies

Strategies indicate specific research areas that will contribute to achieving the objectives. Strategies have been defined at a level that gives research providers guidance on where RIRDC is intending to target its investments over the period 2012-2017 and are intended to contribute to the longer term planning requirements of those providers. Strategies will be complemented with more specific research priorities published annually that provide more detailed guidance about the project areas that RIRDC is seeking to fund in the coming year.

Performance Indicators

Performance indicators are provided to assess whether the research strategies have contributed to the RD&E objectives. Where possible, performance indicators have been linked to benchmarks for previous honeybee industry performance.

RD&E Objectives

Table 6.1 Program objectives and strategies

Objective	Strategies – short term (next 2 yrs)	Strategies – long term (next 5 yrs)
1. Reduce the incidence and impact of pests and diseases on honeybees	Invest in Pollination Program projects	Invest in Pollination Program projects
	To undertake appropriate genetic research to reduce the impact of pests and diseases on honeybees	Undertake <i>Tropilaelaps clareae</i> mite research and ensure incursion response strategies are appropriate/best practice
	Identify techniques to reduce the impact of Asian honey bees on the management of European honeybees	If needed invest in Small Hive Beetle (<i>Aethina tumida</i>) control to arrest its spread and economic impact
	Research the implications of Africanised gene establishment in Australia	Industry survey to evaluate whether RIRDC RD&E investments have resulted in a reduction in production losses caused by pests and diseases.
	Increase awareness of the need to manage and control endemic pests and diseases including <i>Nosema apis</i> , American Foulbrood, European Foulbrood, Chalk brood and sacbrood virus.	
2. Increase the productivity and profitability of beekeepers	Develop techniques and technologies to reduce beekeeper costs such as efficient location of queen bees	Facilitate the development of at least one new Australian apiary product
	Undertake industry production and financial benchmarking to raise average industry productivity for beekeepers working under similar conditions	Industry survey to evaluate whether RIRDC RD&E investments have resulted increased productivity and profitability of beekeepers.
	Identify whether specific floral honeys have specific qualities/properties that could command a premium price	

Objective	Strategies – short term (next 2 yrs)	Strategies – long term (next 5 yrs)
3. Increase understanding of the role of flora in honeybee management	Invest in the Pollination Program	Invest in the Pollination Program
	Assess the impact of various floral resource management options	Develop advice for government, based on research, to inform decisions about access to native flora resources
	Develop approaches to determine floral resource yields	Determine impact of climate change on honey production
	Develop advice, based on research about PAs, that could be used to inform deliberations by international food safety authorities about the allowable level of PAs in food	Better understand the interaction between native flora/ fauna and honeybees
4. Promote extension, communication and capacity building	Ensure honeybee RD&E outputs are in a form that is suitable for internet delivery and state association newsletters	Educate the public and policy makers on the Programs findings
	Preparation and distribution of easily digested compendium of recently completed Program projects and on-going projects	
	To increase uptake of RD&E outcome sponsor conferences at which researchers present their project results	
	Support initiatives to increase beekeeper leadership skills	
	Fund travel that pursues the Program's objectives	

7. Objectives

Objective 1: Reduce the incidence and impact of pests and diseases on honeybees (45%)

Background

Australia is free from some of the most important pests of honeybees, namely *Varroa destructor* and *Tropilaelaps clareae*, being the two major pests. The establishment of these pests in bees in Australia would be a catastrophe for the beekeeping industry causing huge losses of production in both bee products and pollination services as well as the virtual elimination of feral colonies. The beekeeping industry must be well prepared to identify and eradicate any incursion of exotic pests, or in the event that any incursion is not contained, efficient control strategies need to be quickly implemented to minimize the impact of any new pest.

In recent years technological advances in genetics have facilitated the development of powerful tools which can be used to reduce the incidence and impact of pests and diseases on honeybees. This can take several forms; the development of resistant bees, the identification of resistance to pathogens and the identification of undesirable genes.

The more intensive management of bees caused by necessity and the impact of these changes together with emergence of new diseases and pests such as *Nosema ceranae* and the Small Hive Beetle have contributed to a general increase in the incidence of diseases and pests in honey bees in Australia. Effective control strategies that minimize losses caused by the pathogens are necessary to increase the productivity of beekeepers in Australia.

Strategies

- The Pollination Program has allocated 45% of its budget to pest and disease management as well as a further 10% to pest incursion risk minimization. The Honeybee Program supports these objectives by investment in the Pollination Program.
- Support genetics research for pests and diseases control:
 - investigation of genetic variation of *Varroa jacobsoni* and pathology of microbial pathogens
 - the development of a test for the detection of Africanized bees to help facilitate the introduction of new genetic stock into Australia;
 - investigations of the ecology of *Apis cerana* to enhance the understanding of this pest should it become established in Australia
- Support measures to increase awareness of the need to manage and control endemic pests and diseases including American foulbrood, *Nosema apis*, *Nosema ceranae*, European foulbrood, Chalkbrood and sacbrood virus.
- Monitor the effectiveness of current control measures to reduce the impact of the Small Hive Beetle with a view to further studies should the impact of this pest increase.

- Undertake *Tropilaelaps clareae* research and ensure incursion response strategies are appropriate and best practice
- Encourage beekeeper participation and commitment to the industry's QA Program with its requirements for pest/disease control and chemical residue management.
- Develop non-chemical controls for pest and diseases to ensure Australian apiary products.

Performance indicators

- Funds invested in the Pollination Program to support RD&E in pest and disease management and pest incursion risk minimization
- Better understanding of the genetic variation of *Varroa jacobsoni* and pathology of microbial pathogens
- Development of a test to identify Africanized genes in semen.
- Better understanding of the impact on ecology of *Apis cerana*
- Early detection of any Varroa or Tropilaelaps incursion
- Industry survey indicates a reduction in production losses caused by pests and diseases as a result of RIRDC RD&E investments.

Objective 2: Increase the productivity and profitability of beekeepers (20%)

Background

Prices paid for honey have not kept pace with production costs. This has forced beekeepers to change beekeeping practices to strive to maintain their economic viability. Income diversification including new product development is an area which could increase profitability. Increased productivity could be achieved by improvements in bee genetics, best management practices and industry benchmarking.

Strategies

- Facilitate genetic improvement in the Australian honeybee industry through the introduction of superior queen bees
- Facilitate genetic improvement to lift bee hygienic behaviour and control pests and diseases
- Increase the efficiency of beekeeping operations by rapid identification of queen bees in beehives.
- Determine whether specific floral honeys have specific qualities/properties that could command a premium price
- Facilitate the development of at least one new Australian apiary product.
- Undertake industry production and financial benchmarking to raise average industry productivity for beekeepers working under similar conditions.

Performance indicators

- Survey industry undertaken to evaluate whether RIRDC RD&E investments have resulted increased productivity and profitability of beekeepers

Objective 3: Increase understanding of the role of flora in honeybee management (20%)

Background

Honey bees collect nectar and pollen from native flora. Honeybees can also deliver pollination services to horticulture, agriculture and native flora. There is a need to better understand the role of flora in honeybee management and the role of the honey bee in native ecosystems..

The beekeeping industry depends on native floral resource for about 70% of its honey production. Access to native flora continues to be a major issue facing the industry. Continued adequate resources are vital to sustain a profitable and productive honeybee industry.

Strategies

- Invest in the Pollination Program which has resource access, landscape and nutrient management for effective pollination as one of its priorities (10%).
- Develop better understanding of the interaction between native flora/fauna and honeybees.
- Communicate to policy makers research outcomes regarding the role of public forest flora to the apiary industry
- Develop technologies and techniques for determining floral resource yields.
- Invest in research to determine native flora flowering cycles.
- Determine climate change impact on honeybee production by assembling up to date climate research findings and drawing out implications for floral production.
- Develop advice, based on research about PAs, that could be used to inform deliberations by international food safety authorities about the allowable level of PAs in food.

Performance indicators

- Funds invested in Pollination Program so support RD&E in resource access, landscape and nutrient management for effective pollination.
- Research outcomes regarding the role of public forest flora to the apiary industry is communicated to land-use policy makers to help inform decisions regarding apiary industry access to public land.
- Technology developed to determine floral resource yields.
- Native floral flowering cycles determined.
- A synthesis of the likely impact of climate change on honeybee productivity undertaken.
- Research that can inform international food safety authorities as to the allowable levels of PAs in food undertaken.

Objective 4: Promote extension, communication and capacity building (15%)

Background

The Honeybee Advisory Committee has effective linkages with industry, the research community, relevant community groups and government departments. These linkages are important for the efficient management of honeybee research – defining objectives, developing priorities, evaluating results, applying research findings as well as promoting extension, communication and capacity building.

Strategies

- Ensure honeybee RD&E outputs are in a form that is suitable for internet delivery and state association newsletters.
- Prepare and distribute easily digested compendium of recently completed Program projects and on-going projects.
- Support initiatives to increase beekeeper leadership skills.
- Sponsor conferences at which researchers present the results of their Honeybee Program funded project, so as to increase uptake of RD&E project outputs.
- Fund travel that pursues the Program’s objectives.
- Inform the public and policy makers about the Program’s findings.
- Provide a quarterly Honeybee Program Newsletter.

Performance indicators

- Program outputs are made available in user-friendly format.
- Production of a Honeybee and Pollination Research in Progress document is published each year.
- Initiatives to increase the leadership skills of beekeepers are supported.
- Conferences supported at which researchers present the results of their Honeybee Program funded project.
- Funds provided for travel that pursues the Program’s objectives.
- Policy makers informed about relevant Program findings.
- Production of four Honeybee Program Newsletters each year.

8. Proposed Budget (\$'000)

The budget below has been prepared based on forecast levy increases and industry voluntary contributions that have been committed to be made in 2012/13.

	2012/13	2013/14	2014/15	2015/16	2016/17
Opening Balance	583	573	533	503	493
Revenue					
Commonwealth contributions	400	380	390	400	410
Industry statutory levy	340	380	390	400	410
Industry voluntary contributions	300				
Other Income	10	10	10	10	10
Total Revenue	1050	770	790	810	830
Expenditure					
<u>Objectives</u>					
1 Pests & diseases	470	310	310	310	310
2 Productivity & profitability	160	130	130	130	130
3 Role of flora	160	130	130	130	130
4 Extension, communication & capacity building	120	100	100	100	100
RD&E Total	910	670	670	670	670
Committee & Program Administration	150	150	150	150	150
Total Expenditure	1060	820	820	820	820
Closing Balance	573	533	503	493	503

The financial contributions to RD&E for the Honeybee industry over the period 2012/13 to 2016/17 rely primarily on the annual production of honey. It is recognised that circumstances may prevent these contributions being made or enable larger contributions. If that situation occurs, the Advisory Committee will review the status of the five-year RD&E plan and its projects and recommend future investments. RIRDC's Reserves Policy will also inform annual budgeting.

9. Communication, Extension, Adoption and Commercial Opportunities

Purpose and objectives

The Honeybee Program will facilitate the communication and adoption of its outputs through objective 4 of this Plan: Promote extension, communication and capacity building. Commercial opportunities will be identified, and pursued where appropriate, for specific projects through the preliminary research proposal, final research proposal and as the project progresses.

Target Audience and Communication Tools

The target audiences for Program outputs, and the primary communication tools through which they will be reached, are:

1. Beekeepers (who are mostly early or mainstream adopters) – RIRDC newsletter (*Honeybee R&D News*), media releases, research reports and state apiarists association annual conference
2. Parliamentarians (who are early adopters) – briefings on specific issues as appropriate
3. Agencies of government (who are mostly early or mainstream adopters) – RIRDC media releases and research reports

Expected key messages from program outputs

The key messages from the program outputs are expected to include:

1. How to reduce the incidence and impact of pests and diseases on honeybees
2. How to increase the productivity and profitability of beekeepers
3. The implications of an increased understanding of the role of flora in honeybee management

Industry networks

To ensure the Program outputs are communicated to industry stakeholders, the Program's newsletter (*Honeybee R&D News*) is distributed to a suite of peak industry organisations that redistribute the newsletter to their membership.

Major industry events

The Program's outputs will be communicated through a of industry events, such as the annual conferences held by each state apiarists association, and an international conference scheduled for 2013 being organised by NSW Apiarists' Association.

Key influencers

Leaders within the suite of peak industry organisations will be targeted to assist in adoption of the Program's outputs.

Key media/websites

The Program's newsletter (*Honeybee R&D News*) is the primary communication tool with which to communicate the key finding from the Program's project reports. The newsletter and all reports are made available on RIRDC's website.

Commercialisation and IP

Research projects and project outputs will be managed consistent with RIRDC's commercialisation and intellectual property policies.

References

CIE (2005) Future Directions for the Australian Honeybee Industry prepared for the Department of Agriculture, Fisheries and Forestry

Gordon and Davis (2003) Valuing Honeybee Pollination, RIRDC Project No CIE-15A, Pub No 03/077

Kneebone, Martin (2010) A Study of Existing and Prospective Markets and Marketing Activities for Australian Honey, RIRDC Pub No 10/145

RIRDC (2011) Pollination Five-Year R&D Plan 2009-2014

Rodriguez, Riley, Shafron, and Lindsay (2003) Honeybee Industry Survey, Rural Industries Research and Development Corporation, Pub No: 03/039

Honeybee RD&E Plan 2012 – 2017

Pub. No. 12/049

The vision of the RIRDC Honeybee Program is for a productive, sustainable and more profitable Australian beekeeping industry. This 2012-2017 research, development and extension (RD&E) Plan is the sixth plan for the Honeybee Program. Honeybee research has developed progressively since the mid 1980s. Each of the previous plans has reflected the priorities of the Australian honeybee industry at their time of development and this plan builds on their achievements.

This five-year RD&E plan for Australia's honeybee industry builds on the previous plans with a focus on

reducing the incidence and impact of pests and diseases on honeybees, increasing the productivity and profitability of beekeepers, increasing our understanding of the role of flora in honeybee management and promoting extension, communication and capacity building.

Outputs from this program will contribute to RIRDC's diverse range of over 2,000 research publications. Most of our publications are available for viewing, downloading or purchasing online through our website www.rirdc.gov.au. Purchases can also be made by phoning 1300 634 313.

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