



**Australian Government**  
**Rural Industries Research and  
Development Corporation**

# Pasture Seeds

## Five-Year R&D Plan

2008 – 2013

A photograph of a vast pasture field with rows of purple flowers, likely lupines, stretching into the distance under a clear sky.

**RIRDC** Shaping the future





**Australian Government**  

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**Rural Industries Research and  
Development Corporation**

# **Pasture Seeds Five-Year R&D Plan 2008–2013**

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#### **Researcher Contact Details**

Michael Clarke  
AgEconPlus Pty Ltd  
44 Barons Crescent  
Hunters Hill NSW 2110

Phone: 02 9817 5888  
Fax: 02 9816 4840  
Email : [clarke@AgEconPlus.com.au](mailto:clarke@AgEconPlus.com.au) .  
Web : <http://www.AgEconPlus.com.au>

#### **RIRDC Contact Details**

Rural Industries Research and Development Corporation  
Level 2, Pharmacy Guild House  
15 National Circuit  
BARTON ACT 2600  
PO Box 4776  
KINGSTON ACT 2604

Phone: 02 6271 4100  
Fax: 02 6271 4199  
Email: [rirdc@rirdc.gov.au](mailto:rirdc@rirdc.gov.au) .  
Web: <http://www.rirdc.gov.au>

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# Foreword

The pasture seed industry is a small industry that is vital to our livestock and pastoral enterprises.

The Research and Development (R&D) Program administered by Rural Industries Research and Development Corporation (RIRDC) is funded by statutory research levies and matching funds from the Australian Government. The legislative authority for these levies comes from the *Pasture Seed Levy Act 1989* and, at present, the levies cover certified seed for lucerne, clovers, subclover, medics and serradella, with sulla and biserulla currently being added.

An independent review of the Pasture Seeds R&D Program completed by the Centre for International Economics in 2005 revealed that the Program has performed well overall and that four R&D clusters (eight relatively small projects) yielded grower returns sufficient to pay back investment in the entire 53 project portfolio since its inception in 1989. RIRDC has managed this portfolio since inception and the industry covered by statutory levies is strongly supportive of both the Program and the Australian Government's matching funding contributions.

The new five-year plan for the pasture seeds industry details five research objectives that address the whole supply chain as well as economic sustainability and the climate change challenge. The plan has a series of strong themes based around communication and capacity building, improved market knowledge, better managing climate variability, water use efficiency, better understanding the future regulatory environment, technologies embedded in and on the seed, seed production, variety development and farm systems research.

A lot of work has been undertaken in drawing up this plan. It was the subject of a workshop held in Canberra in October 2007 and extensive consultation with industry. On behalf of the Corporation, we would like to thank all those involved for the contribution that they have made.

**Peter O'Brien**  
Managing Director  
Rural Industries Research and  
Development Corporation

**Penny Hendy**  
Chairperson  
Pasture Seeds R&D  
Advisory Committee

# Snapshot of the Five-Year Plan

## Goal

*To maximise opportunities and minimise risks for a profitable and sustainable pasture seeds industry based on a reputation for reliable supply, domestically and internationally, of a range of quality pasture species.*

## Objectives

Plan objectives that drive the 2008-2013 R&D Program along with expected share of the program budget are:

- *Industry Communication and Capacity Building*—The pasture seeds industry recognises that historically industry knowledge collection and dissemination has been difficult and will therefore apportion an increasing share of R&D resources to this activity. The objective addresses information provision, extension, training and travel opportunities for researchers, pasture seed producers, and others involved in the seed industry, recognizing the importance of professional development and skills acquisition for this very specialized industry (15%).
- *Improved Seed Production and Processing Technologies*—to improve seed production technologies in order to lift pasture seed production efficiency (including water use and adapting to climate variability), yield, quality, pest/disease management and processing ease. Delivery of this objective will ensure the industry maintains its comparative advantage in low cost production (60%)
- *Environmentally Sustainable Seed Production Systems*—objective two recognises the industry’s environmental responsibilities and the continued need to better understand and manage its environmental impact along with the way a changing natural environment (climate variability) impacts on its operations. The pasture seeds industry will participate in the formulation of environmental regulation and ensure that it is effective, efficient and sensible. If this objective is delivered, the industry will better understand and manage its environmental impact and provide a good foundation of knowledge for regulators to refer to when environmental regulations are being planned (10%)
- *Monitor, Evaluate and Adopt Emerging Sciences and Technologies*—to ensure that the opportunities, implications and risks of newly emerging sciences, technologies and research results (eg climate modelling) are understood and opportunity is provided for their adoption in the seed industry. Successful execution of this objective will ensure the industry can fully maximize the opportunities when new sciences and technologies emerge (5%)
- *Develop New Pasture Seed Products, Markets and Farm Systems*—addresses three key sub objectives—development of new pasture seed products; understanding the market/capturing new market opportunities; and farm systems research for seed growers. It also addresses the possible need to provide follow up resources for these new products to kick-start their commercialisation following the basic research stage. (10%).

Program budget allocations are indicative and flexible and will be guided by the Pasture Seeds R&D Advisory Committee. The plan is consistent with RIRDC’s overriding aim of maximising the contribution its investments make to the profitability, sustainability and resilience of rural industries and communities.

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## **Abbreviations**

ARRIP	Australian Rural Research In Progress
ASF	Australian Seed Federation, formerly the Seed Industry Association of Australia (SIAA)
CIE	Centre for International Economics
CPI	Consumer Price Index
DAFF Fisheries	Australian Government Department of Agriculture Forestry and Fisheries
DPI	(state) Departments of Primary Industries
GM	Genetically Modified
GVP	Gross Value of Production
IRR	Internal Rate of Return
KPI	Key Performance Indicator
ME	Metabolisable Energy
NBIR	Net Benefit Investment Ratio
NPV	Net Present Value
NZ	New Zealand
PBR	Plant Breeders Rights
QA	Quality Assurance
R&D	Research and Development
RDC	Research and Development Corporation
RIRDC	Rural Industries Research and Development Corporation
SWOT	Strengths, Weaknesses, Opportunities and Threats analysis

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# 1. Purpose of the Plan

A Program Review and Five-Year Research and Development (R&D) Plan to guide investment through to 2013 will have four main purposes:

- To outline the rationale for the Pasture Seeds R&D Program that RIRDC will manage on behalf of the Australian Government and the Australian pasture seed industry.
- To provide clear signals concerning pasture seed R&D needs and priorities for the period 2008 to 2013.
- To encourage and support discussion between the pasture seeds industry, RIRDC and the research, development and extension community, that will enable the future needs of the industry to be identified and incorporated in annual and longer term planning.
- To provide a budget framework for investment in pasture seeds R&D for the next 5 years.

The plan is based on the findings of consultation with industry via a survey of industry members including members of the Grains Council of Australia Seed Committee, Lucerne Australia and Pastures Australia during September and October 2007, as well as a workshop involving a broad cross section of the industry and the RIRDC Pasture Seeds Advisory Committee held in Canberra, 15<sup>th</sup> October 2007. A Draft Plan was presented to the RIRDC Pasture Seeds Advisory Committee in November 2007 and refined following feedback from the Committee.

## 2. The Pasture Seeds R&D Program

### The Pasture Seeds R&D System

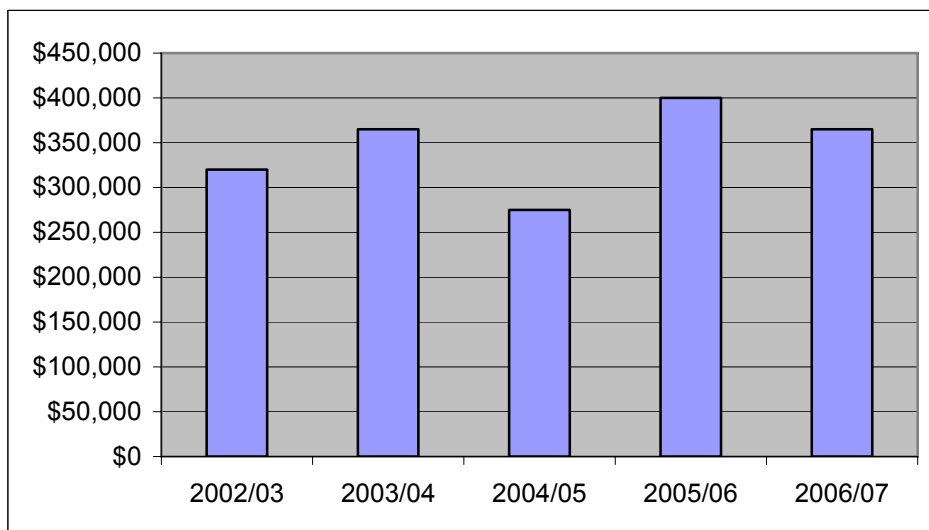
Statutory funding arrangements for pasture seeds research were introduced in 1989. The Pasture Seeds R&D Program has been part of RIRDC since the introduction of statutory funding arrangements. The Program's vision is to include all pasture seeds, including temperate and subtropical grasses and legumes on the provision that recipients of the R&D pay the R&D levy. Funding is from a combination of R&D levies and RIRDC core funds (the funds provided to RIRDC by the Australian Government to support R&D for portfolio industries). The core funding has been phased out and the Program is currently funded by a statutory levy on certified temperate legume pasture seeds and Commonwealth dollar for dollar matching funds.

Levies apply to certified seed for lucerne, clovers, subclover, medics and serradella, with sulla and biserrulla currently being added. Levies are collected by the Seed Certifying Agencies at the time of certification. Some seed of certifiable varieties are sold domestically without being certified, and consequently the R&D Program misses out on those levies.

In addition there are many pasture species, e.g. perennial grasses and subtropical grasses that are not yet covered by the levy. Consequently R&D for those species is not strategically planned at this stage, and research for those species is completed on an *ad hoc* institution-by-institution basis. Under the relevant legislation there is provision for certified seed of other pasture species and cultivars to be added to the Program on the industry's agreement to pay the levy. The subtropical pastures seed growers are understood to be working towards developing a proposal for a levy. It is believed many growers of perennial grass species have a preference for voluntary levy arrangements going towards private research programs.

The existing pasture seeds levy raises between \$160,000 and \$190,000 per annum. When Australian Government matching funds are added to levy payments, along with additional RIRDC contributions for 'one off events' plus funds from sale of publications, interest and royalties, total income is usually between \$300,000 and \$400,000 pa (see Figure 2.1). The 2007-08 research budget, which draws on Program reserves, is currently \$495,000. The value of the Program has increased, droughts notwithstanding, over time. The Pasture Seeds Program currently funds between six and twelve projects per year.

**Figure 2.1: Annual Expenditure Pasture Seeds Program 2003 to 2007**



Source: Fievez 2006 and RIRDC

The grower levy and Australian Government matching funding provided to the Pasture Seeds Program also leverages other resources for the Program's projects. These additional R&D resources add up to a total research effort for pasture seeds of about \$800,000 per annum (CIE 2005).

The RIRDC Pasture Seeds R&D Advisory Committee guides project funding.

### **Pasture Seeds R&D Advisory Committee**

The RIRDC Pasture Seeds Program is overseen by the Pasture Seeds R&D Advisory Committee whose members are nominated by the Grains Council of Australia's Seed Committee, the national body for seed producers in Australia, representing the seed producers of SAFF, NSW Seed Growers, VFF, TASFG, WAFF, and AgForce. The Grains Council of Australia's Seed Committee also invites Lucerne Australia to put forward a nominee for the Committee. Lucerne Australia represents the largest Australian seed-producing sector. The Committee consists of persons with a range of skills and experience in the research, production, processing and marketing sectors of the industry together with representatives of RIRDC. The Committee is responsible for ranking research funding proposals within the framework of the Five-Year R&D Plan and provides recommendations on the allocation of research and development contributions (comprising industry levies and Commonwealth matching) to the RIRDC Board. Its primary focus is on those pasture seeds which are levied to fund the Program.

The Pasture Seeds R&D Advisory Committee consults with industry bodies, such as the Grains Council of Australia Seed Committee, Australian Seed Federation, Lucerne Australia, the White Clover Growers Group, and Pastures Australia to evaluate the requirements of the industry for R&D, to prepare the Five-Year R&D Plan which is reviewed annually and to monitor and evaluate the impact of R&D projects.

### 3. Industry Profile and Future Directions

#### Industry Profile

The Australian pasture seed industry is estimated to generate farm gate sales of around \$35 million pa from certified seed (CIE 2005). It therefore invests a healthy 2.3% of its turnover in R&D. Total industry farm gate value of certified and uncertified seed was estimated at \$120.5 million by the ABS for the year 2004-05. Seventy percent of the Australian pasture and grasses seed industry is not covered by the levy.

Australian production of all pasture seeds is around 2.6% of total OECD pasture seed production (Fievez 2006). The Australian industry is therefore relatively small by world standards, but has the advantage of a geographic location which isolates species from many pests and diseases common elsewhere in the world. Australia is also able to produce seed while the most of the seed producing world winters. This can be a marketing advantage.

The domestic demand for pasture seeds is derived from demand for fodder crops—predominantly for beef cattle and feedlots, dairy and horses—and improved pasture for grazing. Estimates of annual sales of seed in the main pasture crops required to satisfy the domestic market are shown in Table 3.1.

**Table 3.1: Pasture Seeds Domestic Consumption (tonnes)**

<b>Species</b>	<b>Domestic Consumption</b>
Ryegrass	6,200
Lucerne	2,500
Subterranean clover	2,300
Annual medics	1,800
White clover	800
Tall fescue	450
<b>Total</b>	<b>14,050</b>

Source: RIRDC 2003 but broadly consistent with figures presented to the Pasture Seeds R&D planning in Oct 07.

In 2005-06 Australia imported 7,000 tonnes of pasture seeds valued at \$16.5 million. Since 2001-02 the weight of imported seeds has trended upward yet values of seeds imported have more or less remained constant. Drought has caused an interim spike in volumes imported. Pasture seeds imported have been ryegrass, tall fescue and clover seed. Most imported seeds have arrived from New Zealand (4,700 tonnes valued at \$10 million) and the US (2,000 tonnes worth \$5.5 million). The value of imports of pasture seeds within this Program’s scope from 2001-02 to 2005-06 was approximately \$20 million pa (Fievez 2006).

In 2005-06 Australia exported 14,400 tonnes of pasture seeds valued at \$60.5 million. This compares with a five-year average for the period 2001-02 to 2005-06 of 16,500

tonnes and an average value of \$54 million pa. The export value of certified pasture seeds grew steadily 2001-02 to 2005-06 at an average rate of 17% (Fievez 2006).

The US is the biggest importer of Australian pasture seeds, mostly lucerne, worth \$16.4 million to the Australian economy in 2005-06 and totalling about 30% of the Australian pasture seeds market. There are also expanding markets in China, Argentina, Brazil, United Arab Emirates, Saudi Arabia, China, Korea and Germany. The majority of pasture seeds exports were clover and lucerne seed, providing 2,434 tonnes (\$12.5 million) and 6,590 tonnes (\$29 million) respectively to the export market (Fievez 2006).

Leviable pasture seed production is concentrated in South Australia, Victoria and NSW, but there are seed growers in all States and Territories. West Australian seed producers are in the process of developing a procedure to facilitate levy contributions. Victoria produces the largest share of perennial grasses, and north eastern NSW and Queensland the subtropical grasses. The Northern Territory produces a variety of tropical and subtropical grasses. The majority of pasture seed growers are multi-commodity farmers and do not identify as seed growers in census and survey collections. Seventy-five percent of lucerne seed is grown under irrigation.

Australia is an attractive place to produce pasture seed, particularly as every major world climate can be found within the country, and the nation's relative isolation provides an advantage in achieving pure and disease free lines. There is a clear opportunity for the Australian seed industry to expand with potential to increase exports of pasture seeds.

Indeed, the Australian seed industry is now much more a part of a global seed industry than it was a generation ago and the trend to global growth has accelerated in recent years. For instance, the Australian Seed Federation (ASF) has undergone quite dramatic changes in its relationship with multinational companies. Overseas interests now own all of the major Australian seed companies and this has had an impact on ASF's thinking towards the production and sales of Australian seed to overseas destinations.

The levy is collected on certified seed of temperate legume species. Seed is certified by Certification Agencies using laboratories accredited by the International Seed Testing Authority (ISTA). To access many international markets, particularly OECD countries, seed must be certified. Although uncertified seed can be sold domestically, much of it is in fact certified. In the past seed certification and levy collection has relied on the State Departments of Primary Industries (DPIs). NSW Department of Agriculture has withdrawn from this role. Victorian seed certification has been privatised. Legislation will be put to the Australian Parliament in 2008 to ensure that privatised seed certifiers are authorised to collect the levy. Seed that is not certified does not attract the levy. This results in 'leakage', particularly as some companies offer in-house quality assurance programs to meet the needs of some of their markets.

Considerable change to the seed industry was anticipated when PBR was introduced, and many of these changes did occur. However, many of the new proprietary varieties have had difficulty attaining market share with public varieties still having approximately half the share. A number of reasons have been put forward to explain this, including

- unwillingness of customers to try something new as they are:

- not confident that it is an improved product and there is a lack of independent appraisals
- unclear about how best to grow it
- public varieties tending to be cheaper.

An encouraging trend for the industry has been the better understanding by graziers of the benefits of pasture improvement, and their willingness to improve agronomic practice such as sowing seed suitable to their properties and enterprise. Credit for this change is probably shared by many, including RIRDC, agronomists, and the companies who have increased their level of service (better technical backup, an emphasis on seed quality, and more effective distribution). Associated with this improved understanding is the rapid adoption of seed coating, ensuring that the elements necessary for healthy seedling growth are adjacent to the young plants.

Graziers' improved ability to sow seed suitable to their environment and enterprise has been enhanced by the development of the Pasture Species Database, which has replaced the 'Recommended List'. The Pasture Species Database can be accessed at: <http://axel.infodiv.unimelb.edu.au/grasslands/>. This will be further improved at the conclusion of a project being conducted by Pastures Australia which will not only include information about species, but will independently assess all varieties, including proprietary varieties.

Although the total level of seed sales fell in the late 1990s, drought notwithstanding, there is now an upward trend. This upward trend is likely to continue, although this will be partially dependent on the economic performance of such commodities as beef, sheep, and wool. The overall value of seed has increased and this is likely to continue for some time.

In 2006 and again in 2007, the volume of Australian production and the levies collected have been affected by drought conditions. High fodder prices are also impacting on seed production as growers identify failing seed crops, cutting them before seed is set to take advantage of favourable returns in an attempt to defray some production costs. Longer term the industry is exposed to climate variability with its resulting implications for water, pest and disease management.

The seed industry has become more structured, particularly as a result of PBR legislation, which has led to contractual arrangements between growers and seed owners (the holders of the Plant Breeders Rights) —the seed owner being responsible for the marketing of the seed in most cases. Some stakeholders have expressed concern that large corporate distributors are likely to attempt to dominate marketing to farmers and graziers, however, it is likely that regional seed companies will still play a role in pasture seed sales.

The new century has brought substantial changes for seed growers, particularly to the contractual arrangements referred to above (see Reynolds 2007). There has been diversity in ability to cope with these changes. Many seed growers initially welcomed the opportunity to grow seed for a seed company without having to worry about the marketing of the product. However, some are now questioning the value of the benefit to seed growers.

There has been an increased effort in the seed industry to make 'supply and demand' for seed more coincident. Success is dependent on the ability to predict which varieties consumers are going to buy and how much of each variety will be needed. This is often determined by the performance of various commodities, and weather conditions and the task is far from easy. Care must be taken, particularly in an over supply situation, that the marketing risks are spread and not just borne by seed growers. The number of professional and experienced seed growers has noticeably declined in the last few years. The reduction in seed grower numbers is commonly estimated at 10% per annum.

A further concern for the seed industry is to maintain a satisfactory funding stream for R&D. There have been few changes since 1995 in the species of plants that are levied by the Program and the areas where levied seed is grown.

Major successes for the current R&D Program have included:

- The importation and establishment of leaf cutter bees to aid in plant pollination
- Research into the management of underground water for lucerne production in South Australia
- Evaluation and management of lucerne seed wasp in lucerne seed crops.

There are opportunities in the Pasture Seeds industry for productivity and product enhancements through improvements in technology, improved product analysis, standardisation of seed products and crop management. The industry has focused on addressing market requirements, establishing new markets and developing a high quality product.

## Possible Strategic Directions

Possible strategic directions for the industry and the Pasture Seeds R&D Program revealed at the 15 October 2007, R&D Planning Workshop include:

- Better preparing pasture seed producers for climate variability.
- Better communication of the great work already done in pasture seed R&D, and providing the seed industry with timely, relevant information.
- Overcoming researcher capacity constraints.
- Strategies to halt the disappearance of grower skills in an ageing production base.
- Utilising biotechnology including Genetically Modified (GM) plants, and seed implant and coating technologies to meet market demand.
- Developing pasture seed crops with higher metabolisable energy.
- Developing pasture seed crops that are better adapted, more productive and water efficient legumes.
- Capturing the opportunities from a swing back toward livestock production and away from back-to-back cropping systems in acknowledgement of the risk spreading benefits.
- Developing new technologies that package desirable attributes either in the seed or on its coating.
- Optimising breakthroughs in the sustainable production and harvesting of pasture seeds.
- Developing more environmentally friendly seed production techniques.
- Developing a better consumer appreciation of the benefits of improved pastures including:
  - Increased soil fertility when growing legumes
  - Positive economic benefits in comparison to feeding out grains
  - Need for renewed pastures after drought.
- Better alignment of product with market preferences.
- Improving consumer understanding of species potential e.g. overcoming potential environmental problems.
- Facilitating required resources for seed production e.g. pollinators.

These possible strategic directions inform R&D Plan development.



## 4. Key Challenges for the Industry (SWOT)

The following pasture seeds Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis was developed by the industry at the 15 October 2007 R&D planning meeting.

### Strengths

- Low cost of production—competitive with NZ, cheaper than EU and US
- Australia's geographic isolation and relative freedom from pests and diseases
- An established and innovative industry
- A professional industry with high production and marketing standards
- A reliable supply of seed lines
- A developing national focus with opportunities to generate scale economies
- Adoption of integrated pest management systems
- A diverse range of climates and a counter-seasonal production window
- International recognition as a quality seed provider
- Lucerne Australia—establishment demonstrates increasing professionalism

### Weaknesses

- Cannot reliably supply its markets at the current time (drought)
- Increasingly constrained by access to clean land (seed free), water and skills
- High reliance on irrigation for production
- Environmental issues relating to salinity, harvesting and soil degradation
- Too many and confusing products (i.e. too many similar varieties)
- Lack of current information (domestic market, trade, etc) and independent advice
- Failure to communicate and adopt best practice
- Costs of production that are not keeping pace with prices achieved for seed
- Erratic and unpredicted demand resulting in high production costs
- Decreasing investment in plant breeding, extension and other 'public' services
- Lack of identity as seed growers. Some farmers not identified as seed growers in the census, are producing seed for the domestic market
- Production and market size statistics are not available and this hampers industry planning. Demand forecasts are not produced.
- Limited number of good researchers
- An ageing and declining production base
- Poor industry image and appeal

### Opportunities

- Positive outlook for Australian livestock industries compared to crop production, and consequently better demand for pasture seed.
- Increased awareness of the value of reliable, clean seed.
- Replacement of perennial pastures removed through recent reliance on cropping
- Some 30 million ha of pasture more than 90 years old and in need of renovation
- Pasture reestablishment following sustained drought
- An expanding industry with an outlook for growth

- Increasing cost effectiveness of pasture relative to feed grains for sustaining livestock
- Legumes that provide more cost effective soil fertility solutions as the price of diesel and nitrogen increase
- Additional domestic supply potential/import replacement potential for Australian pasture seeds (during the drought domestic seed sales were dominated by imports)
- Additional export potential for Australian pasture seeds (EU, USA, South America)
- Niche product development potential (eg oestrogen replacement)
- Improved product packaging, handling and labelling to add value to quality products
- Further adoption and compliance with quality assurance systems (QA) for those outside the certification system and to guarantee certified seed outcomes
- International multiplication of seed opportunities through overseas ownership of seed companies operating in Australia
- The capacity to solve environmental problems in Australian farming systems using perennial pastures (eg waterlogging)
- Utilisation of biotechnology including Genetically Modified (GM) plants and seed implant and coating technologies
- Opportunities to secure capacity to pollinate pasture seeds into the future through initiatives to develop an Australian pollination industry
- Opportunity to manage change and be proactive in addressing the future (eg participation in the Australian Government's Taking Stock/Setting Directions process)
- Further R&D opportunities as additional species join the R&D Program and cross Research and Development Corporation investments are secured

## **Threats**

- Climate variability/change reducing the productivity and profitability of current pasture seed production systems
- Pest and disease risk through the relaxation of Australian biosecurity or inadvertent infestation. For example loss of industry's ability to pollinate its crops if the Varroa mite spreads from NZ to Australian honeybee populations
- Adverse regulatory and community responses to the environmental impacts of pasture seed production
- Ongoing water reforms with the potential to remove irrigation supplies from pasture seed production and the users of pasture seed (eg irrigated pasture producers)
- Withdrawal of matching Australian Government R&D funds with a resultant halving of funds available for investment
- Reliance on chemicals for pasture seed production
- Managing the development and possibly the release of GM material
- Availability of alternative grain legumes that draw demand away from levied seeds (Program rather than a seed industry threat)

# 5. Review of the Existing R&D Program

Review of the existing RIRDC Pasture Seeds R&D Program is drawn from the following resources:

- R&D Plan for the Pasture Seeds Program 2003-2008 (RIRDC 2003)
- Evaluation of the Pasture Seeds Program: An Overview of All Projects—Stage 1 (CIE 2005)
- Evaluation of the Pasture Seeds Program: Benefit Cost Evaluations—Stage 2 (CIE 2005)
- Pasture Seeds Program Business Review 2006-07 and Workshop 2006 (Fievez 2006)
- Pasture Seeds R&D Advisory Committee response to recent Program reviews (2007).

A brief summary of each of these resources is presented in this chapter along with the Pasture Seeds R&D Advisory Committee response and lessons learned that are relevant to a future Pasture Seeds R&D Program. Details of the review are available in the Appendices of this report.

## The Existing R&D Program

The most recent RIRDC Five-Year R&D Plan for the pasture seeds industry addressed five major research objectives:

- Objective 1: Knowledge collection and dissemination
- Objective 2: Seed production technologies
- Objective 3: Environment
- Objective 4: Emerging sciences
- Objective 5: New products and markets

Details on the nature of these five major research objectives and two supplementary objectives identified in Fievez 2006 are provided below.

### ***Objective 1: Knowledge collection and dissemination***

Assemble and disseminate to various interest groups, knowledge on the Australian pasture seed industry, especially the value of R&D. Through knowledge generation and dissemination support the industry to effectively adjust to change. Key activities include development of a database on the Australian pasture seeds industry; improved information flow through newsletters, field days, a website and e-commerce training; increased awareness of the contribution made by RIRDC funded R&D; and increased awareness of the industry's 'state of play' with a resultant lift in capacity to adjust to change. Encouraging a national perspective on the industry and assistance in the assembly and dissemination of up to date statistics on the industry were also important. This objective was given the highest priority by the industry.

**Objective 2: Seed production technologies**

Improve seed production technologies to maximise yield, quality and processing efficiency. Delivery of this objective would involve identification of constraints to the prosperity of the industry (genetic, environmental and management); an increase in the understanding of factors affecting prosperity; and improved industry management. Key activities were planned to include development of best practice for growing, harvesting and processing pasture seeds; adoption of best practice and QA systems; and increasing the range of useful pasture species for domestic and export sales.

**Objective 3: Environment**

Incorporate environmental considerations into sustainable production systems. Key activities were to include identification of important environmental issues for the seed industry and allocation of R&D funding to these issues; consultation with regulators to ensure a full understanding of legislative requirements; the seeking of R&D funds from regulators/legislators; and prioritisation of risks that may affect the sustainability of the pasture seeds industry.

**Objective 4: Emerging sciences**

Ensure that the opportunities and risks of newly emerging sciences or technologies are widely understood and communicated to the seed industry. Key activities were to include Five-Yearly reviews of developing sciences and technologies relevant to the pasture seeds industry, determination of pluses/minuses of new technologies, making information available through databases and other communication tools and incorporation of findings into best practice guidelines and systems.

**Objective 5: New products and markets**

Develop new products and markets in Australia and overseas for pasture seeds. Key activities were to include market research to determine opportunities for new products; identification of difficulties in converting 'unknown products' into commercially viable enterprises; making any technical requirements needed to develop markets and undertaking trials to further develop new products.

**Other Objectives**

In addition to the five major research objectives driving the R&D Plan for the Pasture Seeds Program 2003-2008 two additional objectives are identified in the Fievez 2006 review of the Program, they are:

- Promoting and facilitating improved industry adoption of key pasture seed research and development findings
- Supporting emerging research talent through provision of travel grants.

**Resource Allocation Under the Current Plan**

R&D resource allocation for the first four years of the current R&D plan is summarised in Table 5.1 below. Planned expenditure for 2007-08 includes budget allocation for projects already commissioned along with four new projects which address the 'seed production technologies' objective and one new project addressing the 'knowledge collection and dissemination' objective.

**Table 5.1 Expenditure by Pasture Seed Program Area (2003-04 to 2006-07)**

Objective	Total (\$' million)	Percentage of Total (%)
Knowledge collection and dissemination	15,966	1
Seed production technologies	994,796	80
Environment	123,500	10
Emerging sciences	100,619	8
New products and markets	0	0
Other (e.g. planning workshop costs)	10,815	1
<b>Total</b>	<b>1,245,696</b>	<b>100</b>

Source: AgEconPlus analysis of RIRDC data

Note that many projects are difficult to categorise and the objectives frequently overlap. For example, all projects satisfy Objective No.1 being properly documented, published, included on the RIRDC web page, and distributed to relevant stakeholders.

During the period 2003-04 to 2006-07 twenty-five projects were approved, an average of six projects per annum. A list of projects approved from 2003-04 to 2006-07 is included as Table 5.2.

New projects under consideration for 2007-08, the final year of the current R&D Plan include:

- Improved harvesting and threshing methods for medic and biserulla pods (Objectives 2, 5, 1)
- Agronomic support packages for raised bed lucerne seed production (Objectives 2 and 1)
- Alternative harvest methods for subclover seed and arrowleaf seed crops (Objectives 2,3, 1)
- Development and assessment of leafcutter bee survival, management and reproduction in southern Australia (Objectives 2 and 1)
- Economic analysis and feasibility of the Australian lucerne seed industry (Objective 1).

The following observations are offered on the Pasture Seeds R&D Program 2003-2008:

- R&D investment was dominated by production research between 2003-04 and 2006-07 and retains this strong emphasis in its final year 2007-08.
- The industry's highest priority, 'Objective 2: knowledge collection and dissemination', received only one per cent of budget allocation (six projects), although many projects naturally involved a component of knowledge collection and dissemination.<sup>1</sup>

<sup>1</sup> In particular, industry had identified the need for marketing information ... eg. to establish the value of Australia's seed industry. In 2004, the Australian Seed Federation proposed Seed Track, a scheme in which seed merchants would confidentially submit marketing information to an independent third party who would then collate and publish the results to members. The RIRDC Pasture Seeds Committee was satisfied that this would be an excellent process to obtain accurate information. Unfortunately, by 2007, it was clear that the seed merchants were reluctant to provide the required information.

- The ‘New products and markets’ objective received no budget allocation, although several projects had this objective as a component, eg. DAW 115A: ‘*Establishing a seed scheme for mixed varieties*’ will enable consumers to buy mixed varieties that have been DNA tested to ensure they are receiving exactly what’s on the label. This will become more important as virgin land is becoming more difficult to obtain.
- Specific projects to assist industry adjust to change have not been initiated however, again, several projects had this objective as a component. In fact, project UTS-8A: ‘*Managing Intellectual Property in plant varieties*’ was completed in 2007, comprehensively reporting the changes PBR has brought to seed producers, particularly in terms of contract growing. This report may lead to further research in this area. Also an ongoing travel program to support emerging industry talent has been established.

A synopsis of recent formal reviews of the Pasture Seeds Program is presented in the balance of this chapter.

**Table 5.2 Projects Funded—Pasture Seeds R&D Program  
2003-04 to 2006-07**

Project No	Title	Start#
<b>1. Knowledge collection and dissemination</b>		
TAO45-14	Visitors for project DAN-209A, Sokoloff, Remizowa and Sandral	2004/05
MS056-42	Pastures Australia	2005/06
TA056-15	Hugh Roberts Travel Award—Luke Kirkby	2005/06
TA067-18	Hugh Roberts Travel Award—Karen Hill and Maria Castle	2006/07
TA067-19	Hugh Roberts Travel Award—Shane Oster	2006/07
<b>2. Seed production technologies</b>		
CSE-91A	Improving lucerne pollination with leafcutter bees—stage 2	2003/04
DAV-196A	Effective weed control for the Australian white clover seed industry	2003/04
DEB-4A	Understanding and managing the causes of abnormal seedlings in lucerne	2003/04
SAR-48A	Confirmation of pest free area status from bacterial wilt of lucerne in export seed production	2003/04
UWA-65A	Solving seed production limits for sulla and purple clover as fodders	2003/04
SAG-6A	Investigation of the impact of toad rush ( <i>Junus bufonis</i> ) on subterranean clover seed production and evaluation of herbicide control options	2004/05
US-131A	Lucerne yellows disease: testing and extension of disease management strategies	2004/05
AUA-1A	Improved maintenance and basic seed production of public pasture varieties	2005/06
DAW-117A	Soft seeded sulla—a novel approach for lowering seed costs	2005/06
SAR-56A	Preliminary assessment of the impact of nematodes on pasture seed production	2005/06
MFM-1A	Irrigation best management practices for white clover seed production	2006/07
SAR-58A	Management of bacterial wilt of lucerne	2006/07
<b>3. Environment</b>		
DEB-3A	A water balance study for lucerne seed production resourced by an underground aquifer	2003/04
DEB-5A	Water balance and quality study for lucerne seed production resources by an underground aquifer	2003/04
DEB-6A	Conversion from border check to drop tube irrigation for lucerne irrigated with saline water	2005/06

Project No	Title	Start#
<b>4. Emerging sciences</b>		
UTS-8A	Managing intellectual property rights in plant varieties	2004/05
DAW-115A	Establishing a seed scheme for mixed varieties for subterranean clover	2005/06

**5. New products and markets**

No specific projects but some meet objectives e.g. DAW 115A, Establishing a Seed Scheme for Mixed Varieties

Source: AgEconPlus analysis of RIRDC data

# Projects with a 2003/04 'Start' may actually have commenced before this date. Data was only requested for the period 2003-2007.



## **Program Reviews**

Three reviews of the Pasture Seeds R&D are summarised in Appendices 2-4. These include:

- Evaluation of the Pasture Seeds Program: An Overview—Stage 1 (CIE 2005)
- Evaluation of the Pasture Seeds Program: Benefit Cost Evaluations—Stage 2 (CIE 2005a)
- Business Review 2006-07 and Workshop 2006 (Fievez 2006)

## **Response to Recent Program Reviews**

The Pasture Seeds R&D Advisory Committee has responded to recent Program reviews by:

- Moving away, at least in part, from funding on the basis of research applications submitted and toward commissioned research. This should provide a more balanced research portfolio in future years.
- Explicitly recognising the under-funding of knowledge collection and dissemination. A new project has already been funded in this area. It is also noted that all projects, as a condition of funding, have a knowledge dissemination component. This is not recorded in the analysis of projects.
- The industry is participating in the Australian Government funded Agri Skills Program. Courses are being developed for all aspects of seed production and will be delivered through TAFE and other registered training organisations (an ASA initiative).

## Lessons Learned

The following 'take home' messages are recorded from a review of the current R&D Program:

- The pasture seeds industry invests a healthy 2.3% of its turnover in R&D.
- During the period 2003-04 to 2006-07 twenty-five projects were approved, an average of six projects per annum.
- In the period 1991 to 2005 fifty-three projects were completed and a total of \$10.43 million invested.
- An excellent program leverage rate has been achieved for RIRDC funds—for every dollar invested a further two dollars fifty is invested by other parties.
- The vast majority of Pasture Seeds Program funding since 1991 is classified as 'production industry competitiveness'.
- Since 2003-04 production research has dominated R&D expenditure.
- The current R&D Plan identifies 'knowledge collection and dissemination' as its most important objective. Measures have been taken to rectify this under-funding.
- The current R&D Plan had not focussed on new products and markets research. Measures have been taken to better balance the R&D portfolio.
- Two additional research objectives—'encouraging adoption' and 'travel grants' were added to the R&D Plan when it was reviewed in 2006, and are priorities for the next Five-Years.
- The allocation of projects by research stage has favoured Stage 2 development style projects—practically oriented investments with immediate application for industry rather than Stage 1—pure or basic research. Investment in Stage 3—adoption of research outcomes has been low when compared to other similar programs, although there have been many project related field days, several newsletters, and project information distributed to relevant stakeholders and obtainable on the RIRDC website.
- The initial assessment of the performance of the Program completed by CIE showed that a smaller share of projects were assessed as having a high impact rating than other programs in the RIRDC portfolio, reflecting in part the smaller scale of the industry and hence bases upon which R&D can add value.
- The detailed analysis of performance completed by CIE showed that overall the Program performed well and that four R&D clusters (eight projects) yielded grower returns sufficient to payback investment in the entire 53 project portfolio.
- Suggestions for improvement in the portfolio made by CIE included improved market knowledge (see footnote on page 11) and a better understanding of the current and future regulatory environment. It should be noted that several members of the Committee belong to other organisations, which provide that service, and can report relevant proposed changes to this Committee.
- A subsequent annual review of the Program (Fievez 2006) concluded that despite drought based setbacks a continuation of the current average research budget (\$350,000 pa) was likely to receive a boost of around \$50,000 pa for the period through to 2011.
- Fievez also concluded that strategies, outputs and outcomes are all on track for 2007-08 and the Program is set for growth with recovery from drought and inclusion of additional species in the levy.
- The Pasture Seeds R&D Advisory Committee has responded to the recent Program review by moving to balance the research portfolio and invest more in knowledge dissemination.

The lessons learned from the review of the current R&D Program inform the 2008-2013 research priority setting.

## 6. External Priorities and R&D Priorities in Other Industries

Priorities for the RIRDC Pasture Seeds R&D Plan 2008-2013 need to be set against knowledge of:

- The broader national R&D agenda including Australian Government National Research Priorities, Australian Government Rural Research Priorities and RIRDC Corporate Goals
- International pasture seeds research trends in similar programs
- Investments in linked and similar industries—including priorities in the fodder crops, rice and grains industries.

A review of research priorities in each of these areas along with a summary of lessons learned is presented in this chapter.

### National Priorities and Rural Research Priorities

Australian Government National Research Priorities as outlined by the Prime Minister on 5 December 2002 are:

- An environmentally sustainable Australia
- Promoting and maintaining good health
- Frontier technologies for building and transforming Australian industries
- Safeguarding Australia.

Government priorities for Rural Research updated in 2007 are (<http://www.daff.gov.au/agriculture-food/innovation/priorities>):

### Rural Research Priorities:

- *Productivity and Adding Value*—improve the productivity and profitability of existing industries and support the development of viable new industries.
- *Supply Chain and Markets* — better understand and respond to domestic and international market and consumer requirements and improve the flow of such information through the whole supply chain, including to consumers.
- *Natural Resource Management*—support effective management of Australia’s natural resources to ensure primary industries are both economically and environmentally sustainable.
- *Climate Variability and Climate Change*—build resilience to climate variability and adapt to and mitigate the effects of climate change.
- *Biosecurity*—protect Australia’s community, primary industries and environment from biosecurity threats.

Supporting the Rural Research and Development Priorities:

- *Innovation skills*—improve the skills to undertake research and apply its findings.
- *Technology*—promote the development of new and existing technologies.

The Government Priorities for Rural Research have been incorporated into RIRDC Corporate Goals and the objectives of the Pasture Seeds R&D Plan 2008-2013.

## **RIRDC Corporate Goals**

RIRDC's Corporate Goals, expressed through the RIRDC Corporate Plan 2003-2008 are:

- Develop new opportunities—to achieve a more diverse rural sector through development of new agricultural and related industries
- Adopt new technologies and systems for established industries—to enhance and foster innovative rural industries through targeted investment in research and development
- Improve the competitiveness and sustainability of Australian agriculture—to enhance the efficiency and sustainability of agriculture by research into trade and environmental options to improve profitability while safeguarding future agricultural production potential
- Underpin innovation and change in Australian agriculture—to build a broader comprehension of farm and regional community opportunities and human capacity for change, learning and innovation in Australian agriculture.

RIRDC's Corporate Goals are driven by the principle that it will invest in less commercially attractive projects.

## **Research Priorities of R&D—Other Programs**

Other R&D Programs provide a framework for development of research priorities and show the boundaries between programs of research and opportunities for cross-investment, program development and cooperation. These have been summarised in Appendix 5

## **Lessons Learned**

Review of national research priorities along with R&D priorities in other industries reveals the following lessons:

- There is a national emphasis on productivity, supply chains, natural resources and biosecurity. Skills development is receiving additional attention as is managing for climate change
- US industry research priorities are consistent with those in Australia with a strong emphasis on natural resource management but also 'farm management systems' research
- The Fodder Crops R&D Program has similar R&D objectives with additional emphasis on quality, biosecurity and program monitoring and evaluation
- Rice and grains R&D Programs have a strong emphasis (50% of budget) on variety development. New products, market access, communications and capacity building are also important.

Directions for the Pasture Seeds R&D Program 2008-2013 are set within the framework of national research priorities as are priorities in the other programs.

# 7. Consultation Findings

Consultation findings drive the new R&D Plan. Consultation to secure broad ownership of future research directions in the 2008-2013 R&D Plan was completed with pasture seeds producers, market analysts, seed companies, researchers and academics using the following process:

- Preparation of an R&D priority setting background paper that detailed information on the nature of the Pasture Seeds R&D Program, current plan objectives, history, performance and outlook for the R&D Program, national research priorities, research priorities in other industries and key questions for consideration
- Distribution of the background paper along with a returnable Pasture Seeds R&D survey. A sixty-six per cent response rate was achieved on the survey
- Presentation of the background paper to the 15 October 2007 Canberra workshop and workshopping of potential research priorities with stakeholders
- Targeted follow-up with key stakeholders with additional requests for comment on specific objectives and strategies
- Circulation of a draft Five-Year R&D Plan to the Pasture Seeds R&D Advisory Committee for comment.

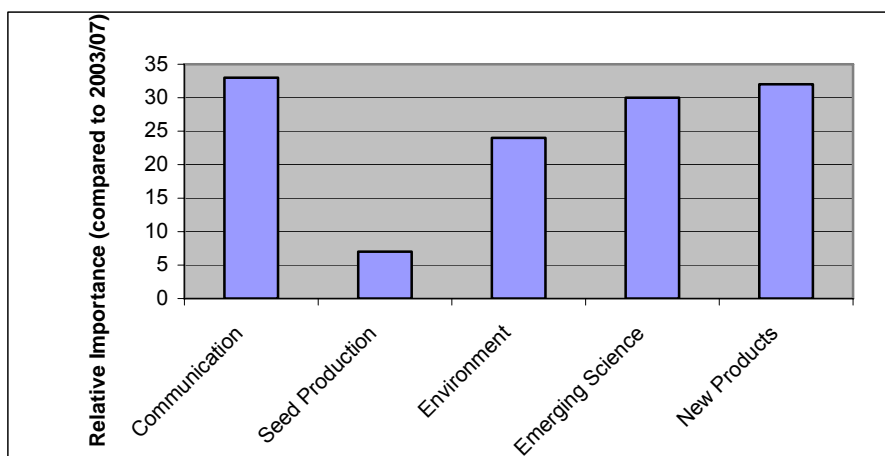
Results from the consultation process have been aggregated and reported in the section below.

## Future R&D Priorities

Survey respondents were asked whether the RIRDC Pasture Seeds R&D Program should spend more or less of its total budget on its five current research objectives and whether they could nominate any new areas requiring research that the Program was not addressing.

Priorities, relative to expenditure for the period 2003-2007 are shown in Figure 7.1

**Figure 7.1 Future R&D Priorities—Relative to Expenditure 2003-07**



Source: Pasture seeds industry survey results

From Figure 7.1 it can be seen that relative to the high levels of expenditure on seed production during the period 2003-07, more research was requested on:

Communication and capacity building—knowledge collection and dissemination including information provision, extension, training and travel opportunities for researchers and pasture seed producers and others involved in the seed industry.

Environment—environmentally sustainable pasture seeds production systems including understanding and managing the industry’s environmental impact and providing a good foundation of knowledge for regulators to refer to when environmental regulations are being planned.

Emerging science—monitoring, evaluating and adopting emerging sciences and technologies relevant to the pasture seeds industry and offering information about opportunities, implications and risks.

New products—development of new pasture seed products, understanding the market/capturing new market opportunities, and farm systems research for seed producers were suggested as priorities in the new products area.

Seed production technologies to maximise yield, quality and processing efficiency were still seen as being of paramount importance to the Pasture Seeds R&D Program through to 2013.

## **Specific Research Suggestions**

Specific suggestions for new areas of research to ‘flesh out’ the above priorities included:

- Climate change/variability research in relation to its impact on the pasture seeds industry.
- Farm systems research including the economic advantages of growing pastures including increased soil fertility by growing legumes.
- Regulatory environment research.
- Market information—forecasting and reporting.
- Relationship development with extensionists (Kondinin, Birchip, Pastures Australia, GRDC.).
- Communication of research outcomes especially fact sheets.
- Additional investment in skills development.
- Biosecurity research in relation to both import risks and export barriers.
- Market access for export opportunities.
- Management practices, eg incorporating GMs.
- Drought-proofing seed production.
- Carbon storage potential of perennial crops.

Research breakthroughs were identified as:

- New herbicide group—selective cost effective grass herbicides.
- Harvesting technology breakthrough.
- Seed coating with herbicide to kill weed seeds.

Other key messages to emerge from consultation and the workshop included:

- There is a confusing large number of pasture seed varieties in Australia and overseas.
- A National Variety Testing Scheme for new pastures is needed post discontinuation of the National Variety Testing Scheme but is prohibitively expensive.
- There is not enough demonstrated evidence that there is genetic gain in new varieties.
- Tropical pastures need breeding research. Very little has been done since the 1970s.
- Quality assurance is a big issue for this industry.
- Climate change research is also prohibitively expensive, RIRDC Pasture Seed Committee will be aware of climate change research conducted by better funded groups.
- The Pasture Seed Program needs to have a higher profile in key communications forums.

## 8. Industry Commitment to Research

The Australian pasture seeds industry is strongly committed to R&D. Questions posed during the R&D plan consultation revealed:

- Overwhelming support for the RIRDC Pasture Seeds R&D Program—all but one respondent indicated that the Program has played a critical role in ensuring the pasture seeds industry remains competitive, profitable and sustainable
- Overwhelming support for the role played by government—100% of respondents indicated that government should continue to match each dollar growers provide to the Program.

Additional specific comments in relation to commitment included:

- This Program is vital, there is little alternative funding in this area
- The work completed is very relevant eg water use efficiency, managing climate change
- The Program addresses a gap created when state governments wound back R&D
- Sustainability awareness is just one thing we can't get from the major seed companies
- Individual farmers can not invest on their own in R&D
- The Program is very professional
- Program's projects have solved many industry problems
- Government involvement ensures there are public good outcomes eg environmental R&D.



# 9. The R&D Program 2008—2013

## Key Themes Shaping Future Research Directions

Key themes emerging from Program review, external priorities, consultation and the direction-setting workshop are:

- Climate variability including its implications for water use efficiency
- Communications and capacity building
- Improved market knowledge
- Better understanding of the future regulatory environment
- Technologies embedded in and on the seed
- Farm systems research
- Climate variability/change and participation in the carbon economy.

## Goal

*To maximise opportunities and minimise risks for a profitable and sustainable pasture seeds industry based on a reputation for reliable supply, domestically and internationally, of a range of quality pasture species.*

## Objectives

Five objectives drive the 2008-2013 R&D Program:

- Industry communication and capacity building
- Improved seed production and processing technologies
- Environmentally sustainable seed production systems
- Monitoring, evaluating and adopting emerging sciences and technologies
- Developing new pasture seeds products, markets and farm systems.

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 five 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 2008-2013 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 R&D objectives. Where possible, performance indicators have been linked to benchmarks for previous pasture seeds industry performance.

## Resource Allocation

Budget allocation has been prepared following analysis of historical allocations and consultation findings see Table 9.1 below.

**Table 9.1 Historical and Suggested Resource Allocation by Plan Objective (%)**

<b>Objective</b>	<b>Historical Allocation (2003-07)</b>	<b>Proposed Allocation (2008-13)</b>
Industry communication and capacity building	1	15
Improved seed production and processing technologies	80	60
Environmentally sustainable seed production systems	10	10
Monitoring, evaluating and adopting emerging sciences/technologies	8	5
Developing new products, markets and farm systems	0	10
<b>Total</b>	<b>100</b>	<b>100</b>

Source: AgEconPlus analysis and industry survey

Chapter 10 of this document provides a consolidated plan budget based on a 'normal case' scenario and forecast levy increases.

## **Objective 1: Industry Communication and Capacity Building**

The pasture seeds industry recognises that there is always more that can be done to address industry knowledge collection and dissemination and will apportion an increasing share of R&D resources to this activity. The objective addresses information provision, extension, training and travel opportunities for researchers and pasture seed producers and others involved in the seed industry, recognising the importance of professional development and skills acquisition in this very specialised industry.

### **Strategies**

- Investigate opportunities to furbish the industry with superior and proactive outlook information and strategy setting opportunities across the whole ‘plant to animal’ supply chain. This research should include a pasture seeds risk analysis to help the industry plan long term for climate change, droughts and other changes (The canola industry has recently completed this form of industry risk assessment)
- Investigate the development of a process to obtain pasture seed statistics (scoping study)
- Prepare an economic analysis of the pasture seeds industry to demonstrate its value to livestock sector performance and profitability
- Provide information to promote a better appreciation of the benefits of improved pastures
  - In comparison to feeding out expensive grain
  - Where there is a need for pastures to be restored after drought
  - Highlighting the benefits of legumes with soil fertility
- Exert influence through Pastures Australia and similar forums to ensure pasture seeds industry priorities are incorporated into wider and synergistic pasture, livestock and cropping systems research
- Investigate the development of a process to forecast seed demand bearing in mind the success of forecasting work completed by ABARE
- Provide proactive help to pasture seed producers to assist them in understanding and adjusting to industry (eg marketing systems) and environmental (eg climate) change
- Develop communication processes to ensure relevant stakeholders receive information about R&D. Consider shared conferences (Lucerne Australia, Fodder Crops, Pastures Australia, etc), field days, demonstration projects (eg Birchip Group), symposia, websites, newspaper columns, etc. Be aware of information overload/fatigue and piggy back on existing forums and channels rather than creating new ones
- Promote the R&D Program to other sectors of the seeds industry, levy payers and potential researchers. A successful promotion program will help to galvanise existing and new levy payer support for the Program
- Develop strategies to hold the disappearance of grower skills in an ageing production base including continuing to support the current program of travel and emerging talent grants. Better promote the Hugh Roberts Travel Award to ensure a wide field of applicants. Consider creating links with the DAFF Young Rural Leaders groups or their replacement

## **Performance Indicators and Related Measures**

- Investigation of opportunities to develop an industry database of information
- Process to obtain pasture seed statistics developed by December 2008
- Information to promote a better appreciation of the benefits of improved pastures by December 2010.
- Pasture seeds industry co-hosting an industry conference by December 2010
- Pasture seeds industry engaged through one other 'extension forum' (field day, symposia, newspaper column, etc) by December 2009
- A wide field of applicants applying for the Hugh Roberts Travel Award by 2009.

## **Indicative Share of R&D Budget**

- 15% of the Program budget to be allocated to Objective 5
- Historically this area has received 1% of funding under the R&D Plan.

## **Objective 2: Improved Seed Production and Processing Technologies**

### **Objectives**

Objective two is to improve seed production and processing technologies in order to lift pasture seed production efficiency (including water use and adapting to climate variability), yield, quality, pest/disease management and ease of processing. Delivery of this objective will ensure the industry maintains its comparative advantage in low cost production.

### **Strategies**

- Consider climate change research outcomes and develop research initiatives that increase the pastures seeds industry's capacity to adapt to climate variability and uncertainty.
  - Develop pasture seed production systems that deliver water use efficiency.
  - Research and adapt relevant water application technologies emerging in other broadacre production industries, and encourage Pastures Australia to check varieties for seed yields when conducting field tests in various environmental conditions including drought and increased salinity,
- Consider new technologies research that increases the value of the pasture seed industry.
  - Investigate the potential of internal seed additive technologies for their profitable application to the Australian pasture seeds industry.
  - Investigate the potential of remote sensing and precision agriculture research outcomes for the pasture seeds industry and adopt these when they can be shown to add to industry productivity. Potentially prospective areas for remote sensing include pest and disease management and yield mapping.
- Develop pasture seed production systems that enhance industry yield, quality and processing/de-hulling efficiency. This may incorporate research into the application of seed coatings.
- Investigate systems that will reduce the industry's reliance on production chemicals.
- Facilitate required production resources for the seed industry, e.g. to continue to contribute to research to protect and promulgate key pollination agents such as leaf cutter bees and the European honeybee.
- Develop and adapt seed coating technologies that deliver production advantage (fertiliser application, weed control, etc) to the Australian pasture seeds industry.
- With full knowledge of past difficulties, revisit research into pasture seed harvesting technologies and consider new investments to improve harvesting efficiency and environmental performance.
- Invest in solutions to increase the ease, efficiency and cost effectiveness of seed cleaning, and seed drying equipment. Emphasis should be on technology to remove same size weed seeds, foreign matter and soil. Equipment needs to be effective and energy efficient.
- Investigate the potential of a cost/benefit study of industry production and developing financial benchmarking tools.

## **Performance Indicators and Related Measures**

- By 2009 the pasture seed industry will understand the consequences of climate change and be working to incorporate this knowledge into its research, development and extension projects.
- 15% increase in industry water use efficiency between 2007 and 2013.
- By 2013, 90% of levy payers will have received information outlining realistic alternatives to industry chemical usage for seed production.
- Overall productivity improvements in line with at least the long term average for Australian agriculture (3.5% pa).
- Parameters to be measured using industry consultation and survey.

## **Indicative Share of R&D Budget**

- 60% of the Program budget to be allocated to Objective 1.
- Historically this area has received 80% of the R&D Plan budget and stakeholders support a lower level of allocation while still retaining this objectives overall importance.

## **Objective 3: Environmentally Sustainable Seed Production Systems**

### **Objectives**

Objective two recognises the industry's environmental responsibilities and the continued need to better understand and manage its environmental impact along with the way a changing natural environment (climate variability) impacts on its operations. The pasture seeds industry will participate in the formulation of environmental regulation and ensure that it is effective, efficient and sensible. If this objective is delivered, the industry will better understand and manage its environmental impact, which will provide good foundation of knowledge for regulators to refer to when environmental regulations are being made.

### **Strategies**

- Identify and prioritise environmental issues as a precursor to investment.
- Develop a more environmentally friendly and cost effective sub clover harvester.
- Develop more environmentally friendly but just as efficient and cost effective seed production techniques.
- Monitor, and where appropriate invest R&D funds, in the development and adoption of Environmental Management Systems (EMS) for the pasture seeds industry.
- Identify current and emerging environmental regulations, and seek to be included in the planning processes. CIE 2005 concluded that a better understanding of environmental regulation would lead to productivity gains for the Pasture Seeds industry.

### **Performance Indicators and Related Measures**

- Environmental issues identified (both production linked and climate change related) and response strategies by the end of 2009.
- A more environmentally friendly, but just as efficient and cost effective sub clover harvester developed.
- The identification of at least one suitable EMS project, and this information made available to levy payers.
- National and State environmental legislators approached to include seed producers in their R&D planning processes.

### **Indicative Share of R&D Budget**

- 10% of the Program budget to be allocated to Objective 2.
- Historically this area has received 10% of the R&D budget and proposed allocation is consistent with the Program's history.

## **Objective 4: Monitoring, Evaluating and Adopting Emerging Sciences and Technologies**

Objective three is to ensure that the opportunities, implications and risks of newly emerging sciences, technologies and research results (eg climate modelling) are understood and the opportunity is provided for their adoption in the seed industry. Successful execution of this objective will ensure the industry can fully maximise the opportunities when new sciences and technologies emerge.

### **Strategies**

- Develop a review process for emerging sciences and technologies relevant to the seed industry. The first review should be completed in the first half of the new five-year plan period.
- Use the outcomes of the emerging sciences and technologies review to update pasture seed industry best practice guidelines and other communication materials.
- Monitor and communicate potential industry opportunities, threats and risks created through biotechnology, climate change modelling and other research outcomes<sup>2</sup>.

### **Performance Indicators and Related Measures**

- A review process of emerging sciences and technologies relevant to the pasture seeds industry be developed.
- Best practice guidelines made available to the industry as developed. These will be continuously updated as new research results are accepted for publication.
- Regular communication with the industry on emerging sciences and technologies.

### **Indicative Share of R&D Budget**

- 5% of the Program budget to be allocated to Objective 3.
- Historically this area has received 8% of R&D Plan allocation.

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<sup>2</sup> This activity would involve only general awareness raising. It is not associated with making recommendations to the industry that may expose the Pasture Seed Program to legal liability.



## **Objective 5: Developing New Pasture Seed Products, Markets and Farm Systems**

### **Objectives**

Objective four addresses three key sub objectives—development of new pasture seed products; understanding the market/capturing new market opportunities; and farm systems research for seed growers. It also addresses the possible need to provide follow up with further resources for these new products to kick-start their commercialisation following the basic research stage.

Unfortunately, strategies are within the confines of a small budget, which does not enable plant breeding. Participants in the workshop and those surveyed indicated a desire to develop varieties for a number of purposes:

- To provide higher levels of Metabolic Energy (ME) for grazing ruminants.
- To ensure seeds crops are better adapted to climate variability, and more productive legumes.
- To develop more water efficient varieties.

### **New Product Strategies**

- Identify which new products need more resources to kick start commercialisation following the R&D phase, and determine the required resources. This may include marketing of the commercialisation opportunity to potential seed company partners.
- Better align products with market preferences.
  - Utilising biotechnology including genetically modified (GM) plants to meet market preferences.
  - Invest to develop additional technologies that package desirable attributes either in the seed or on its coating.
  - Research improved systems for product packaging, labelling and handling to ensure product arrives on farm in an attractive manner with its purchased qualities intact.
- Consider investment, as a lower order priority, in niche products such as high value small volume seeds for pharmaceutical use eg red clover as a human oestrogen replacement.
- Subject to tropical seed industry paying funds (levy or voluntary contribution), commission tropical pasture seed research. Very little has been done in the way of new product development in this area for more than a generation.

### **New Market Strategies**

- Complete broad-brush international market scans/opportunity identification exercises to ensure that the best and most profitable market opportunities (including emerging South American opportunities) are known to the Australian industry.
- Commission research to inform objective science based standards for international market access protocols eg tolerable soil levels in subclover seed exported to New Zealand.

## **Farm System Strategies**

- Collate and distribute information regarding rotational and other management systems for seed producers to maximise farm production and capitalisation on nitrogen build up.
- Distribute information regarding ways to incorporate new species into farm systems in relevant environments
- Develop systems to better incorporate pastures into cash cropping enterprises (including co- investment through Pastures Australia where appropriate).  
Encourage cash croppers to spread risks by including pastures in their rotation.

## **Performance Indicators and Related Measures**

- New product strategies: one new commercially sound product between 2007 and 2013.
- Farm system strategies: information regarding rotational and other management systems for seed producers to maximise farm production and capitalisation on nitrogen build up, collated and distributed.

## **Indicative Share of R&D Budget**

- 10% of the Program budget to be allocated to Objective 4, 5% to each of the three sub-objectives.
- This area received no funding under the last Five-Year Plan.

# 10. Proposed Budget

A Five-Year R&D Plan budget has been prepared by projecting forecast levy increases on historical revenues received. The resulting estimate is for a five-year 'normal case'. A suggested budget is presented in Table 10.1.

**Table 10.1 2008—2013 Five-Year Plan**

	2008-09	2009-10	2010-11	2011-12	2012-13
<b>REVENUES</b>					
Statutory Industry Levies	\$150,000	\$160,000	\$150,000	\$150,000	\$150,000
Commonwealth Contributions	\$150,000	\$160,000	\$150,000	\$150,000	\$150,000
All other income	\$50,500	\$50,500	\$50,500	\$50,500	\$50,500
<b>TOTAL REVENUE</b>	<b>\$350,500</b>	<b>\$370,500</b>	<b>\$350,500</b>	<b>\$350,500</b>	<b>\$350,500</b>
<b>EXPENDITURE</b>					
Obj 1 Communication and capacity	\$70,000	\$70,000	\$70,000	\$70,000	\$70,000
Obj 2 Production and processing	\$175,000	\$175,000	\$175,000	\$175,000	\$175,000
Obj 3 Environment	\$35,000	\$35,000	\$35,000	\$35,000	\$35,000
Obj 4 Emerging sciences	\$17,500	\$17,500	\$17,500	\$17,500	\$17,500
Obj 5 New prod, markets, farm systems	\$52,500	\$52,500	\$52,500	\$52,500	\$52,500
R&D Program Total	<b>\$350,000</b>	<b>\$350,000</b>	<b>\$350,000</b>	<b>\$350,000</b>	<b>\$350,000</b>
Project Administration	\$45,000	\$45,000	\$45,000	\$45,000	\$45,000
<b>TOTAL</b>	<b>\$395,000</b>	<b>\$395,000</b>	<b>\$395,000</b>	<b>\$395,000</b>	<b>\$395,000</b>
<b>Operating result</b>	<b>-\$44,500</b>	<b>-\$24,500</b>	<b>-\$44,500</b>	<b>-\$44,500</b>	<b>-\$44,500</b>
Revenue minus expenditure	\$518,830	\$474,330	\$449,830	\$405,330	\$360,830
<b>CLOSING RESERVES</b>	<b>\$474,330</b>	<b>\$449,830</b>	<b>\$405,330</b>	<b>\$360,830</b>	<b>\$316,330</b>

RIRDC and the Pasture Seeds R&D Advisory Committee will determine annual funding priorities. Determination will be driven by:

- Annual pasture seed production
- The range of seeds covered by the Program and industry levies
- Whether legislation is passed allowing for additional authorised levy collection agents
- Other emerging unforeseen priorities
- Any further changes to RIRDC/Pasture Seeds Committee's reserves policy and other relevant matters.

# References

- CIE (2005) Evaluation of the Fodder Crops and Pasture Seeds Programs: An Overview of All Projects—Stage 1, A report for RIRDC
- CIE (2005a) Evaluation of the Fodder Crops and Pasture Seeds Programs: Benefit-Cost Evaluations—Stage 2, A report for RIRDC
- GRDC (2007) Annual Operating Plan 2007-08
- Pierre Fievez & Associates (2006) Pasture Seeds Program Review of Progress Against Objectives
- Reynolds, R. (2007) Plant Breeder's Rights and Contract Growing in the Pasture Seeds Industry—A Market in Transition prepared for RIRDC
- RIRDC (2003) R&D Plan for the Pasture Seeds Program 2003-2008
- RIRDC (2006) Pasture Seeds Completed Projects in 2005-2006 and Research in Progress as at June 2006

# Appendices

## Appendix 1: Contacts for the R&D Program

**Ms Annette Sugden**

**Senior Research Manager**

Rural Industries Research and Development Corporation

PO Box 4776

KINGSTON ACT 2604

Phone : (02) 6271 4138

Fax : (02) 6271 4199

Email : [annette.sugden@rirdc.gov.au](mailto:annette.sugden@rirdc.gov.au)

Web : [www.rirdc.gov.au](http://www.rirdc.gov.au)

**Mrs Penny Hendy**

Chairperson

Pasture Seeds R&D Committee

RMB 2708

KATUNGA VIC 3640

Phone : (03) 5865 8312

Fax : (03) 5865 8302

Mobile : 0409 658 312

Email : [geofpenn@bigpond.com](mailto:geofpenn@bigpond.com)

## Appendix 2: Evaluation of the Pasture Seeds Program: An Overview—Stage 1

*Please also refer to explanatory notes in the body of the report.*

In December 2005 the Centre for International Economics (CIE) completed a Stage 1 initial assessment of the Pasture Seeds R&D Program (CIE 2005) and a Stage 2 benefit cost analysis of selected projects (CIE 2005a). The Stage 1 assessment covered all Pasture Seeds Program projects since RIRDC Program inception in 1991 including the first two years of the current R&D Program. Results from the Stage 1 review are provided below.

### Program Funding

Between 1991 and 2005 the Pasture Seeds Program supported 53 projects with an expenditure of \$10.43 million. RIRDC contributed 43% of the funds for these projects (including the levy), research organisations contributed 33% and industry members and others made up the remaining 24%. The high share of industry contributions in the Pasture Seeds R&D Program may have been due to the contributions of commercial partners in the development of new varieties of seed.

Nevertheless, an excellent overall Program leverage rate was achieved for RIRDC funds—for every dollar invested other parties invested a further two dollars fifty.

### Project Classification

CIE 2005 classified Pasture Seeds R&D Program projects according to the Department of Agriculture Fisheries and Forestry (DAFF) classification scheme. DAFF classification forms the first level of the classification used by RIRDC in their evaluations. See table below.

**Table A2.1 Pasture Seeds Program by DAFF Classification**

Classification	Number of Projects	Share of RIRDC funding (%)	Share of Research Organisation funding (%)	Share of total funding (%)
Production industry competitiveness	39	39	34	90.2
Production sustainable development	3	65	25	4.8
Markets	4	65	21	4.6
Industry training and development	4	90	10	0.3
Communication	3	100	0	0.1
<b>Total</b>	<b>53</b>	<b>43</b>	<b>33</b>	<b>100</b>

Source: CIE 2005

The vast majority of Pasture Seeds R&D Program funding since 1991 (over 90%) is classified as ‘production industry competitiveness’.

## Stage of R&D

CIE 2005 also classified the Pasture Seeds research portfolio according to the Stage of R&D undertaken in the project. R&D can be thought of as a three-stage process:

- Stage 1: represents fundamental or basic research. It may be scientific in nature, for example exploring plant physiology, or it can be economic, for example, looking at the potential returns on an activity before it is pursued. The distinguishing characteristic of this research stage is that its outputs are inputs into further research. The RIRDC Pasture Seeds R&D Program invested 8.5% of available funds into Stage 1 projects between 1991 and 2005
- Stage 2: specific outcome driven research that can be used in some type of production. The Pasture Seeds R&D Program invested 84.6% of available funds into Stage 2 projects between 1991 and 2005
- Stage 3: promoting the adoption of research outcomes. Some 6.9% of Pasture Seeds R&D Program funds were invested in Stage 3: promoting the adoption of research outcomes.

Stage of R&D investment results are presented in table below.

**Table A2.2 Stage of R&D**

Classification	RIRDC funding (%)	Research organisation funding (%)	Other (%)	Total (%)
Stage 1	10.2	4.0	11.9	8.5
Stage 2	82.9	89.6	80.7	84.6
Stage 3	6.9	6.5	7.4	6.9
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Source: CIE 2005

For established industries like pasture seeds there tends to be a higher proportion of Stage 2 projects—practically oriented investments with immediate application for industry rather than Stage 1—pure or basic research. Allocation of resources (6.9%) to promoting the adoption of research outcomes is low when compared to other R&D Programs. For example, the RIRDC Fodder Crops R&D Program invests 9% and the RIRDC Rice Industry R&D Program invests 15% of available funds in encouraging research adoption.

## Initial Assessment Results

An initial assessment of the performance of the Program was prepared by CIE in consultation with representatives of the Pasture Seeds R&D Committee. Results are summarised in Table A2.3.

**Table A2.3 Initial Assessment by Total Funding**

<b>Project Impact Ranking</b>	<b>RIRDC funding (%)</b>	<b>Research organisation funding (%)</b>	<b>Other (%)</b>	<b>Total (%)</b>
High	14.7	6.1	30.2	15.6
Medium	48.0	38.2	42.5	43.3
Low	22.4	31.2	11.0	22.5
Input	0.7	0.0	0.0	0.3
Too early	10.0	22.6	13.3	15.0
Not known	3.6	2.0	2.9	2.9
No output	0.6	0.0	0.1	0.5
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Source: CIE 2005

The majority of projects (51%) and funding (43%) were assessed as having a medium impact. A smaller share of projects (15.6% of funding) were assessed as having a high impact. This is a lower share than other established industries in the RIRDC portfolio, reflecting in part the smaller scale of the industry and hence the basis upon which R&D can add value.



## Appendix 3: Evaluation of the Pasture Seeds Program: Benefit Cost Evaluations—Stage 2

Please also refer to explanatory notes in the body of the report.

Stage 2 of the CIE review of the RIRDC Pasture Seeds R&D Program (CIE 2005a) addressed investment returns from four project clusters. They were:

- Pasture seeds—updated valuation of new varieties
- Water balance for lucerne seed production
- Managing lucerne seed wasp
- Improving subterranean clover seed production.

**Table A3.1 Cluster Evaluation Results—RIRDC Pasture Seeds R&D**

Pasture Seeds Evaluation Outcomes	NPV (\$M)	Cost (\$M)	NBIR (%)	IRR (%)
Pasture seeds—updated valuation of new varieties	1.75	0.95	3	19
Water balance for lucerne seed production	4.92	0.24	21	31
Managing lucerne seed wasp	10.32	0.05	214	118
Improving subterranean clover seed production	0.15	0.46	1.3	7

Source: CIE 2005a

The table above shows what CIE believes to be the most likely pay offs from R&D and the following comments are made:

- Two of the four projects analysed have satisfied the pay off requirements of RIRDC i.e. a Net Benefit Investment Ratio (NBIR) >8X cost or an Internal Rate of Return (IRR) >25%
- From a total investment of \$1.7 million, return was estimated at \$17.4 million. Returns from the four clusters analysed, eight projects in a total Pasture Seeds portfolio of fifty-three projects, were more than sufficient to offset the total cost of the investment portfolio (\$10.43 million).
- Environmental and social benefits were not quantified in the analysis and are in addition to the results presented in Table 5.6. The ‘*water balance for lucerne seed production*’ cluster contributed to industry’s water use efficiency and the ‘*managing lucerne seed wasp*’ project led to a major reduction in the use of pesticides.
- The investment results suggest that Pasture Seeds R&D performed well and results were in line with R&D completed in other RIRDC established industries.

Lessons drawn from this Stage 2 evaluation by the CIE relevant to a review of the Pasture Seeds R&D Program were:

- Revisiting the '*pasture seeds—updated valuation of new varieties*' project resulted in a downgrading of benefits due to unexpected changes in the size of the potential market for new pasture seed varieties. CIE raised the question as to whether better market forecasting could have improved the allocation of scarce R&D funds. AgEconPlus noted that 'lack of effective collection and dissemination of knowledge' was a priority for the current R&D plan that has largely gone unaddressed<sup>3</sup>.
- The assessment included several projects where adoption was through regulation. CIE noted that it would assist both project selection (*ex ante*) and assessment (*ex poste*) if better knowledge were available on likely regulation. AgEconPlus noted that 'getting close' to regulators was identified as a priority in the existing plan (Objective 3: Environment) and that this appears to have received little subsequent attention in funding allocation (see Table 5.2)<sup>4</sup>.

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<sup>3</sup> The ASF, the seed marketer's organization, the only group who can compile complete market information, had planned to do so, but failed. The Australian Seed Authority (ASA) has plans to compile market information from export statistics. Funding allocation may not be necessary.

<sup>4</sup> Three of the committee members are members of the GCA Seed Committee which 'gets close' to regulators, and is kept conversant with planned changes in regulation. Funding allocation has not been necessary.

## **Appendix 4: Business Review 2006/07 and Workshop 2006 (Fievez 2006)**

*Please refer to explanatory notes in the body of the report.*

Following the 2005 CIE evaluation of the Pasture Seeds R&D Program Pierre Fievez & Associates completed a business review and stakeholder workshop for the Program for RIRDC (Fievez 2006).

### **Business Review Overview**

Fievez 2006 found that:

- Pasture seed production was affected by drought conditions across all pasture seeds growing areas in 2006 and there was likely to be a lag effect on future income that could be offset, at least in part, by increased production volumes post-drought.
- There is the possibility of increased statutory levy income in 2007-08 if regulation is passed by Parliament to expand the number of authorised levy collection agencies. Consequently the Pasture Seeds Program budget may need to be revised (Legislation not yet passed Oct 2007).
- RIRDC continues to work with the Grains Council of Australia and the Australian Seeds Federation to negotiate an expansion in the range of leviable seeds.
- A 2007-08 R&D research budget of \$495,000 is proposed, this is up from \$364,000 in 2006-07 (NB: Drought may force a downward revision in this budget Oct 2007).
- In implementing the RIRDC Reserves Policy, financial reserves are estimated to be \$435,000 at June 2008. A strategy to reduce reserves will be phased in over the next three years to ensure research capacity is available to effectively allocate this money.

### **Budget Forecasts 2007 to 2011**

Fievez 2006 also included a forecast of Pasture Seeds Program income, total R&D expenditure and closing reserves for the period through to 2010-11. Budget forecasts for the Program, current at October 2007, are shown in the table below.

**Table A4.1 Budget Forecasts 2006/07 to 2010/11**

	2006-07	2007-08	2008-09	2009-10	2010-11
	Actual	Forecast	Forecast	Forecast	Forecast
<b>INCOME</b>					
Statutory Industry Levies	\$156,734	\$160,000	\$150,000	\$160,000	\$150,000
Commonwealth Matching Contributions	\$170,683	\$160,000	\$150,000	\$160,000	\$150,000
All other income	\$94,926	\$50,250	\$50,500	\$50,500	\$50,500
<b>TOTAL</b>	<b>\$422,343</b>	<b>\$370,250</b>	<b>\$350,500</b>	<b>\$370,500</b>	<b>\$350,500</b>
<b>EXPENDITURE</b>					
Research	\$310,080	\$450,000	\$350,000	\$350,000	\$350,000
Coordination and Management	\$32,256	\$19,000	\$19,000	\$19,000	\$19,000
Program Management Fees	\$14,000	\$14,000	\$14,000	\$14,000	\$14,000
Communications	\$7,749	\$12,000	\$12,000	\$12,000	\$12,000
<b>TOTAL</b>	<b>\$364,085</b>	<b>\$495,000</b>	<b>\$395,000</b>	<b>\$395,000</b>	<b>\$395,000</b>
<b>Operating result</b>	<b>\$58,258</b>	<b>-\$124,750</b>	<b>-\$44,500</b>	<b>-\$24,500</b>	<b>-\$44,500</b>
Retained surplus at beginning of period	\$585,322	\$643,580	\$518,830	\$474,330	\$449,830
<b>Retained surplus at end of reporting period</b>	<b>\$643,580</b>	<b>\$518,830</b>	<b>\$474,330</b>	<b>\$449,830</b>	<b>\$405,330</b>

Source: RIRDC September 2007

Fievez 2006 concluded that total annual income received and R&D expenditure is expected to trend upwards over the next Five-Years. However, this expected change has not been factored into the 2007-2011 budget. Currently, income is forecast to remain at around \$350,000 over the next Five-Years. R&D expenditure is forecast to increase in 2007-08 to allow a reduction in the amount of reserves held.

### **Review of the Five-Year Plan Performance and Outputs**

Fievez 2006 also commented that the RIRDC Pasture Seeds Program is the only R&D Program focussed specifically on seed growing. Industry levies supporting the Program have been trending upwards reflecting increased sales of certifiable seeds, and the development of Lucerne Australia late in 2005 reflects the industry sector's desire for a higher profile in both policy development and research.

Research provider performance in this Program has generally been sound. However there are a limited number of pasture seed researchers and most undertake research over a broad range of areas. Several research stalwarts provide the bulk of seed specific research.

Outcomes from the Program in 2007-08 are expected to include:

- Maximised yield, quality and processing efficiency resulting from identification of improved seed agronomy techniques
- Improved understanding of crop impacts arising from pasture management practices
- Improved leverage of research funding through cooperation with other R&D corporations

- Enhanced understanding of the Program objectives and research undertaken
- Understanding of how to incorporate environmental considerations in sustainable production systems.

***Outlook for the Pasture Seeds Program***

Fievez (2006) noted that the Pasture Seeds Program is likely to expand over the next Five-Years as the livestock industry recovers from drought, and the range of seeds covered by the Program is expanded, and levy rate adjusted to reflect the increased value of seed (0.05%). None of these outlook assumptions is 'ironclad'.

## **Appendix 5: Research Priorities of R&D Other Programs**

### **New Zealand and United States Research**

No New Zealand or United States (US) pasture seed R&D program was identified. Current USDA research priorities across pasture, forages, rangelands and turf include: (<http://www.ars.usda.gov/research/programs/programs.htm>):

- Improved water management, storages and practices
- Collection, enhancement and preservation of germplasm
- Improvement in pest management practices
- Understanding and improving industries role in the environment
- Enhancement of soil and soil management practices
- Development of integrated farm management systems.

The US places a strong emphasis on the natural resource management aspects of pasture research along with farm systems.

### **Fodder Crops R&D Program**

Fodder crops, like pasture seeds is a long established Australian agricultural industry that has grown in importance over the last ten years. Both fodder crops and pasture seeds are part of the RIRDC Established Industries Portfolio. Fodder is defined as the wide range of crops and pasture species that are grown, harvested and lightly processed to facilitate both farm use and domestic and export trade. Lucerne hay, produced using inputs from the pasture seed industry is one important fodder crop. R&D priorities for this industry, as defined in the Fodder Crops R&D Program 2004-2009 are:

- New products and markets
- Plant breeding and germplasm evaluation
- Crop agronomy
- Hay and silage production, processing and transportation
- Improved fodder quality
- Industry biosecurity and environmental management
- Industry communication and information flows
- R&D program management, monitoring and review.

Fodder Crops R&D Program objectives are similar to those for the pasture seeds industry with additional emphasis on quality, biosecurity and program monitoring and evaluation.

## **Rice R&D Program**

The Rice R&D Program is also part of the RIRDC Established Industries Portfolio and the Program has recently revisited their Five-Year R&D Plan. Priorities and their relative budget allocation through to 2011 are:

- Varietal improvement and pure seed maintenance (50%)
- Crop establishment, agronomy/crop physiology, nutrition management and precision agriculture (10%)
- Crop protection (10%)
- Farming systems for farm management, profitability and sustainability (10%)
- Technology transfer, communication, policy and communities (10%)
- Market access and marketing arrangements (3%)
- Human capital formation (7%).

The Program has a very strong emphasis on production research.

## **Grains R&D Corporation Program**

The Grains R&D Corporation (GRDC) is responsible for planning, investing and overseeing R&D, delivering improvements in production, sustainability and profitability across the Australian grains industry. GRDC invests approximately \$130 million pa. Its priorities, as expressed through its Annual Operating Plan 2007-08, are new variety development (50% of funding), cropping practices research including sustainability and crop protection (34%), new product development including value chain and business development investments (10%) and communications and capacity building (6%).

The communications and capacity building budget is similar to that of the Pasture Seeds R&D Program as a percentage of available funding but reflects the economies of scale achievable for a much larger program. A 10% allocation for new product development is noted as relevant for the pasture seeds industry.

# Pasture Seeds Five Year R&D Plan 2008 – 2013

Pub. No. 08/056

This Pasture Seeds Five-Year R&D Plan 2008–2013 details five research objectives addressing the industry's whole supply chain as well as its economic sustainability and climate-change challenges. The Plan has a series of strong themes based around communication and capacity building, improved market knowledge, better management of climate variability, water use efficiency, better understanding of the future regulatory environment, technologies embedded in and on the seed, seed production, variety development and farm systems research. The development of this Plan was the subject of a workshop held in Canberra in October 2007 with extensive industry consultation.

The Pasture Seeds R&D Program is managed by the Rural Industries Research and Development Corporation (RIRDC) and is funded by statutory research levies and matching funds from the Australian Government. The Program aims to facilitate the growth of a profitable and sustainable pasture seeds industry based on a reputation

for the reliable supply, domestically and internationally, of a range of pasture species. An independent review of the Program revealed that RIRDC managed research has yielded grower returns sufficient to pay back investment in the entire Program since its inception in 1989. RIRDC has managed this Program since inception and the industry covered by statutory levies is strongly supportive of both the Program and the Australian Government's matching funding contributions.

RIRDC manages and funds priority research and translates results into practical outcomes for industry. Our business is about new products and services and better ways of producing them. Most of the information we produce can be downloaded for free from our website: [www.rirdc.gov.au](http://www.rirdc.gov.au).

RIRDC Books can be purchased online or by phoning 02 6271 4100.

## Rural Industries Research & Development Corporation

PO Box 4776

KINGSTON ACT 2600

Level 2,  
15 National Circuit  
BARTON ACT 2600

Phone: 02 6271 4100

Fax: 02 6271 4199

Email: [rirdc@rirdc.gov.au](mailto:rirdc@rirdc.gov.au)

Web: [www.rirdc.gov.au](http://www.rirdc.gov.au)

# rirdc.gov.au



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