Australian Government

Grains Research and Development Corporation

# GRDC Annual Report 2005-2006

www.grdc.com.au

GRDC

Grains Research & Development Corporation

*Meeting stakeholder needs through cooperative innovation*

## GRDC Vision

Driving innovation for a profitable and environmentally sustainable Australian grains industry.

# GRDC

The Grains Research and Development Corporation is a statutory corporation with a mandate to plan and invest in R&D for the Australian grains industry. Its primary business activity is the allocation and management of investment in R&D.

## GRDC Mission

To invest in innovation for the greatest benefit to stakeholders. This will be achieved by being a global leader in linking science, technology and its adoption with industry and community needs.

## GRDC Values

- Commitment and action in meeting our stakeholder/customer needs and exceeding their expectations
- Winning as a team
- Achievement of superior results
- Creativity and innovation
- Openness and trust in dealing with people
- Performance-driven culture
- Ethical behaviour in all our activities

Above: *John Hamparsum, from Breeza, NSW, will need to re-assess the role of sunflowers in his cropping enterprise due to reduced water allocations.* Photo: Rebecca Thyer

# 2005–06 Highlights

## Successes

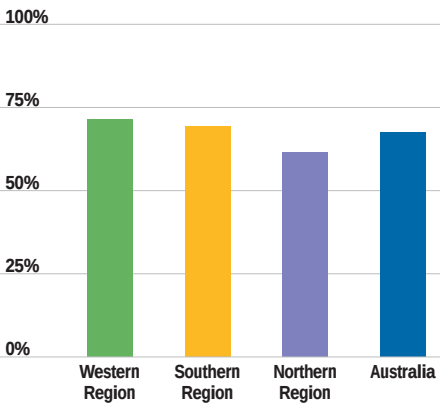
The proportion of Australian growers claiming to have benefited from grains research reached 77 percent nationally, exceeding the 2005-06 target by 7 percent. Benefits directly attributed to GRDC initiated programs increased 2 percent from 66 percent to 68 percent in 2005-06.

Other GRDC successes for 2005–06 included:

- successfully establishing National Variety Trials (NVT) across all the major grain-growing regions of Australia
- facilitating the formation of a single national barley-breeding program
- facilitating the formation of a single national pulse-breeding program
- making substantial progress towards commercially sustainable, world-leading wheat-breeding programs
- entering into a joint venture with Philom Bios Inc. of Canada to commercially develop new soil inoculant products
- developing with the Bureau of Rural Sciences a framework to report on the Australian grains industry's contribution to ecologically sustainable development
- improving the alignment between GRDC activities and the objectives of our key customer groups—the Australian Government and Australian graingrowers—as well as other stakeholders, including grower organisations and research partners
- improving collaboration with the International Maize and Wheat Improvement Center (CIMMYT) in Mexico
- cooperating with other R&D corporations (RDCs) and providing information to the Department of Agriculture, Fisheries and Forestry regarding the Australian Government's Uhrig-based review of the governance arrangements of all statutory authorities, including the RDCs.

**Figure 1 Australian growers' benefits**

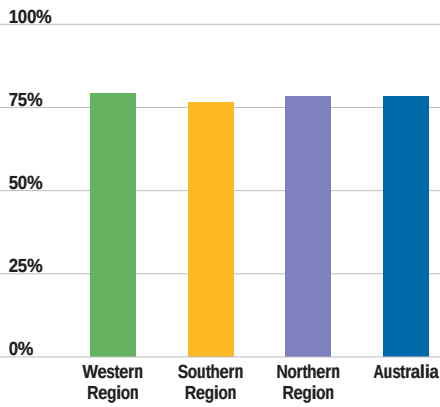
Percentage of growers directly benefiting from GRDC activities over the past five years




*Source: The Grower Annual Indicator Survey 2006*

**Figure 2 Australian growers' adoption**

Percentage of growers adopting new or improved agronomic practices over the past five years




*Source: The Grower Annual Indicator Survey 2006*

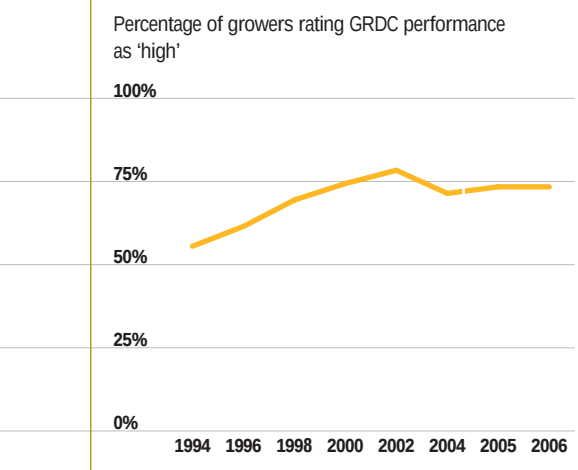
## Challenges

Farming profit margins were squeezed in 2005–06, in particular by higher input costs associated with fuel, fertiliser and transport, and by lower grain prices.

To meet the challenge of achieving a profitable and environmentally sustainable Australian grains industry, in 2005–06 the GRDC continued to work with industry and R&D partners to:

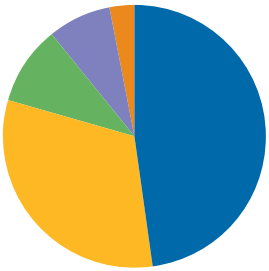
- formulate a nationally coordinated approach to grains R&D, to reduce fragmentation and duplication and to ensure maximum leverage for R&D expenditure
- maintain current levels of R&D expenditure, and evaluate and agree on a balanced total grains R&D portfolio in which there is no duplication or fragmentation
- develop an industry-wide agreement on the evaluation and development of genetic modification technology as it applies to the Australian grains industry
- support the development of superior varieties and best farming practices, to ensure graingrowers remain competitive and profitable and that maximum value is returned to growers
- encourage cross-industry cooperation on common issues and challenges facing the Australian grains industry
- develop improved information delivery channels, including an enhanced GRDC customer database to more effectively deliver relevant information to identified stakeholder groups.

**Figure 3 GRDC performance**




*Source: The Grower Annual Indicator Survey 2006*

**Figure 4 GRDC R&D investments in 2005–06**



| | | |
|---|---|---|
| Varieties | **$55.1m** | (47.8%) |
| Practices | **$36.7m** | (31.8%) |
| New Products | **$11.2m** | (9.7%) |
| Communication and Customer Services | **$8.9m** | (7.7%) |
| Other | **$3.4m** | (3.0%) |

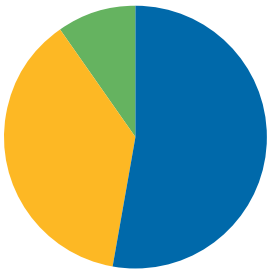
# 2005–06 Highlights

## Five years at a glance

| | 2005–06 | | 2004–05 | 2003–04 | 2002–03 | 2001–02 |
|---|---|---|---|---|---|---|
| **GRDC** | | | | | | |
| Revenue | $115.1m | ▲ | $110.0m | $122.3m | $116.2m | $114.2m |
| Expenditure | $126.7m | ▲ | $119.5m | $124.0m | $112.0m | $113.8m |
| Operating surplus/(deficit) | ($11.6m) | ▲ | ($9.5m) | ($1.7m) | $4.2m | $0.4m |
| Total assets | $127.7m | ▼ | $135.7m | $141.0m | $151.7m | $150.0m |
| Total equity | $82.4m | ▼ | $94.0m | $102.5m | $104.2m | $102.5m |
| Industry contributions | $60.9m | ▼ | $64.2m | $68.8m | $65.0m | $63.2m |
| Commonwealth contributions | $43.1m | ▲ | $35.7m | $42.3m | $39.1m | $40.8m |
| R&D expenses | $115.3m | ▲ | $106.4m | $112.5m | $101.3m | $101.2m |
| Employees | $5.5m | ▲ | $5.2m | $4.9m | $4.0m | $3.5m |
| Suppliers | $5.3m | ▼ | $5.5m | $6.1m | $5.8m | $6.0m |
| Number of full-time GRDC staff positions | 50 | ▲ | 46 | 43 | 42 | 38 |
| **Grains industry** | | | | | | |
| Estimated number of grain farms[a] | 37,122 | ▼ | 37,841 | 38,574 | 38,802 | 38,466 |
| Number of grain crops covered by R&D levies | 25 | | 25 | 25 | 25 | 25 |
| Estimated gross value of production | $8,613m | ▲ | $7,000m | $9,800m | $4,746m | $7,968m |
| Total grain production—summer and winter crops | 43,042,000 tonnes | ▲ | 38,076,000 tonnes | 45,966,000 tonnes | 19,194,000 tonnes | 41,686,000 tonnes |

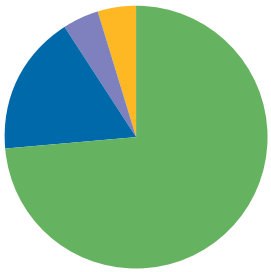
**a** ABARE estimates for the total number of broadacre farms planting more than 30 hectares per annum for grain production

**Figure 5 GRDC total income in 2005–06**



| | | |
|---|---|---|
| Graingrower levy | **$60.9m** | (52.9%) |
| Australian Government | **$43.1m** | (37.4%) |
| Interest, royalty and other | **$11.2m** | (9.7%) |

**Figure 6 GRDC total expenditure in 2005–06**



| | | |
|---|---|---|
| Commitments | **$93.4m** | (73.7%) |
| New investments | **$21.9m** | (17.3%) |
| Employees | **$5.5m** | (4.3%) |
| Suppliers and other | **$5.9m** | (4.7%) |

# Letter of Transmittal

Australian Government
Grains Research and Development Corporation

13 October 2006

The Hon. Sussan Ley, MP
Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry
Parliament House
CANBERRA ACT 2600

cc The Hon. Peter McGauran, MP
Minister for Agriculture, Fisheries and Forestry

Dear Parliamentary Secretary

In accordance with section 9 of the *Commonwealth Authorities and Companies Act 1997* (CAC Act) and section 28 of the *Primary Industries and Energy Research and Development Act 1989* (PIERD Act), I have pleasure in presenting the annual report of the Grains Research and Development Corporation for the year ended 30 June 2006.

The GRDC is confident that its performance in 2005–06 contributed to the industry's and the government's vision for a profitable, internationally competitive and ecologically sustainable Australian grains industry. This vision is consistent with the GRDC's responsibility to plan and report against the:

- objects in the PIERD Act
- planned outcomes as embodied in *Driving Innovation*, the corporation's Five Year Research and Development Plan 2002–07, and as stated in the Annual Operational Plan 2005–06
- inputs and outputs and their contribution to the corporation's outcomes and outputs framework.

This annual report complies with the planning and reporting requirements prescribed by the CAC Act. Under section 9 of the CAC Act, GRDC directors are responsible for producing an annual report in accordance with the rules laid down in Schedule 1 of the Act, including a 'Report of Operations' prepared in accordance with the Finance Minister's Orders.

The attached Report of Operations forms an integral component of the GRDC's outcome and outputs framework and was prepared in accordance with a resolution of the corporation's directors on 25 September 2006. In my opinion, this report presents fairly the information required by the Minister for Finance and Administration as set out in the Commonwealth Authorities and Companies (Report of Operations) Orders 2002, issued on 30 June 2002.

Yours sincerely

TERRY J ENRIGHT
Chairman

GRDC Grains Research & Development Corporation

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# Contents

# Contents continued



*Brad Wood, graingrower from Kendenup, WA, says: 'No-till—it's a challenge, you make mistakes but keep moving ... at the end of the day I really enjoy growing a good crop.'* Photo: Brad Collis

PART ONE

# Overview

# Overview of the GRDC

The Grains Research and Development Corporation (GRDC) was founded in 1990 under the *Primary Industries and Energy Research and Development Act 1989* (PIERD Act).

The corporation has two key customer groups: the Australian Government and Australian graingrowers. Its role is to invest in R&D and related activities to benefit graingrowers, other grains industry participants and the wider community. In doing so, the GRDC invests in research where obstacles to the industry's progress exist and where R&D may be effective in overcoming such obstacles.

This includes:

- investigating and evaluating the requirements for R&D in the grains industry
- coordinating or funding R&D activities
- facilitating the dissemination, adoption and commercialisation of the results of R&D.

The GRDC determines its priorities together with industry, government and research providers, and acts in partnership with public and private researchers, other R&D funding organisations, agribusiness and grower groups.

The GRDC is funded jointly by a levy collected from graingrowers based on the value of grain they produce, and contributions from the Australian Government. The industry levy is collected on 25 crops, spanning temperate and tropical cereals, oilseeds and pulses.[1] The Australian Government matches the levy income up to a maximum of 0.5 percent of the average gross value of grains production, provided the government's contribution does not exceed grower levies.

The GRDC's organisational structure and objectives recognise the complexities of the grains industry and its investment needs. Planning, delivering and communicating R&D outputs occurs in an environment that embraces governments, industry groups, research partners, other R&D investors and those operating in the industry itself—particularly Australian graingrowers.

1 Crops with levies are: wheat; coarse grains—barley, oats, sorghum, maize, triticale, millets/panicums, cereal rye and canary seed; pulses—lupins, field peas, chickpeas, faba beans, vetch, peanuts, mung beans, navy beans, pigeon peas, cowpeas and lentils; and oilseeds—canola, sunflower, soybean, safflower and linseed. The levy for all crops is 0.99 percent of the net farm gate value of grain produced, except for maize which is levied at 0.693 percent of net farm gate value.

## Organisational outcome

In a dynamic environment, the GRDC addresses R&D priorities to meet national, regional, commodity and multicommodity challenges, in order to achieve the following overall outcome:

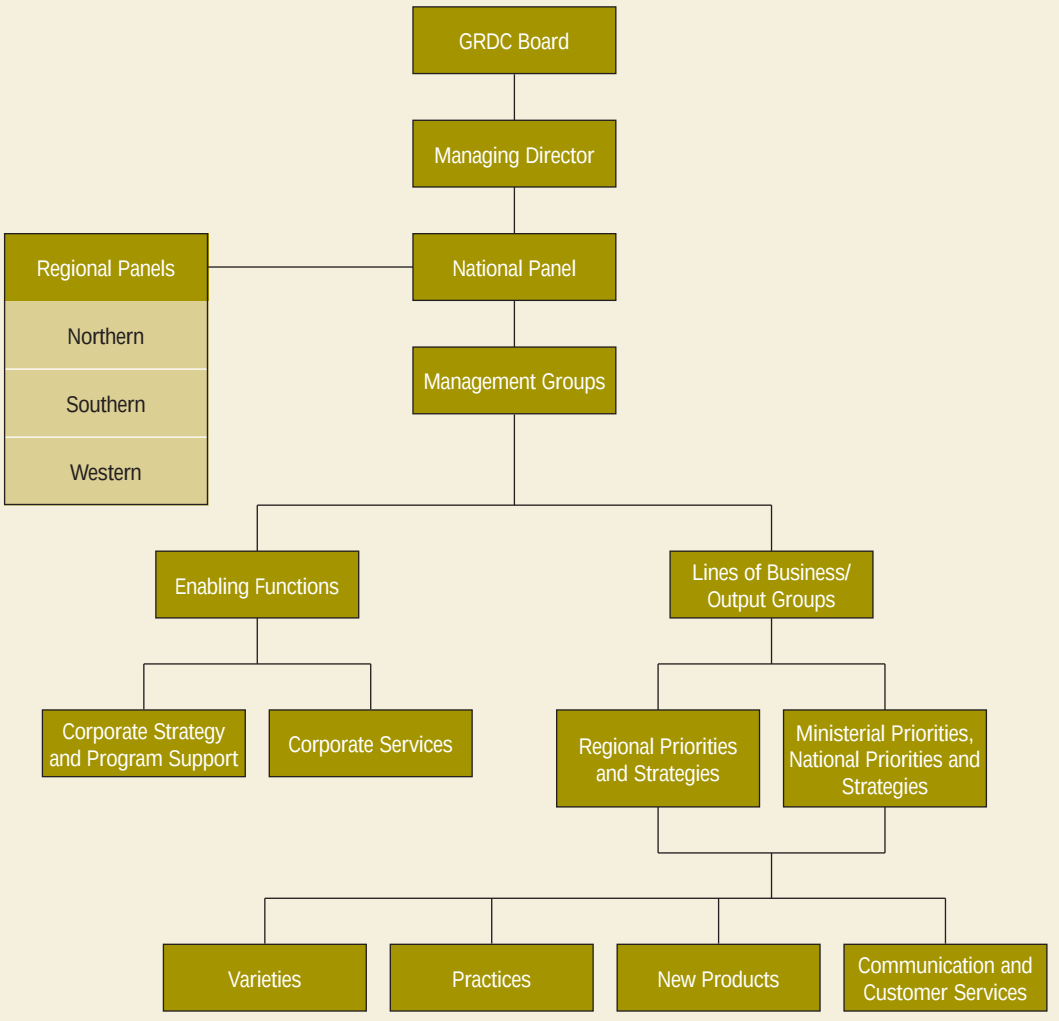
> Through its commitment to innovation, an Australian grains industry that is profitable and environmentally sustainable for the benefit of the industry and wider community.

The outcome reflects the corporate vision in *Driving Innovation*, and is consistent with the Department of Agriculture, Fisheries and Forestry's portfolio goal of achieving more sustainable, competitive and profitable Australian agricultural, fisheries, food and forestry industries.

## Structure

The organisational structure of the GRDC is shown in Figure 7.

**Figure 7 GRDC structure, 2005–06**



*The GRDC Executive Management Team. L–R: Back—*
*Vic Dobos (Communication and Customer Services),*
*Vince Logan (New Products),*
*Peter Reading (Managing Director),*
*Greg Fraser (Practices).*
*Front—*
*Gavin Whiteley (Corporate Services),*
*John Harvey (Varieties),*
*Iftikhar Mostafa (Corporate Strategy and Program Support).*

## Board and Executive Management Team

As described in more detail in Part 3, a board of nine directors governs the GRDC, while a team of executive managers based in Canberra leads the corporation's business activities. As well as advising the GRDC Board, the management team is responsible for realising the Board's priorities and managing and evaluating R&D investments in the Australian grains industry.

## National Panel

The National Panel includes the chairs of the GRDC's three regional panels, the GRDC's Managing Director and the GRDC's executive managers. It is the key body for developing and recommending to the Board the GRDC's overall corporate strategies and direction, and assists the Board in maintaining linkages with its two key customer groups, the Australian Government and Australian graingrowers, as well as research partners.

The National Panel also develops and recommends investment proposals for the national elements of the GRDC's research programs. In doing so, the National Panel considers advice from the four program teams that manage the GRDC's R&D investment portfolio. The program teams are discussed in more detail in Part 3.

## Regional panels

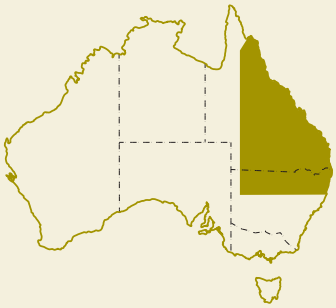
The GRDC recognises variations in local conditions, and provides for separate advisory panels to cover the northern, southern and western grain-growing regions of Australia. Figure 8 illustrates the geographical spread and characteristics of each region. Part 3 provides details of the membership of the regional panels.

The three regional panels develop regional investment priorities and make recommendations on the allocation of investment budgets to meet regional needs. This is also achieved through their membership on program teams that advance recommendations on investments to the GRDC Board via the National Panel. Regional panels also identify investments that may respond to national priorities.

An additional core function of the regional panels is to provide an interface with graingrowers and researchers, to promote awareness of the GRDC's investments and research outcomes and the corporation's strategic direction. The Board views the work of these panels, and the expertise of their members, as crucial to the corporation's success.

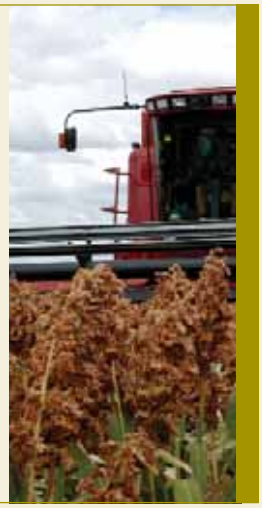
**Figure 8 GRDC regions**

## NORTHERN REGION

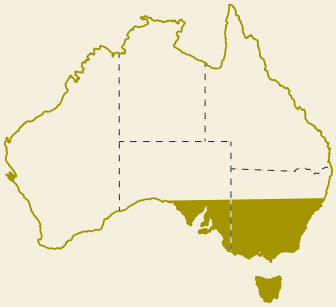


Northern Region characteristics include:

- tropical and subtropical climate
- high inherent soil fertility
- yield dependency upon conservation of soil moisture from subtropical rainfall
- substantial enterprise size
- diversity in crop choice
- need for better-adapted pulses
- premium high-protein wheats for export and domestic markets
- high-potential yields
- competition with cotton

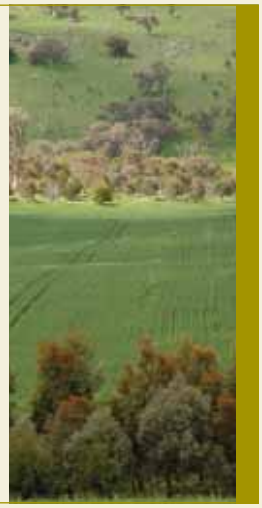


## SOUTHERN REGION

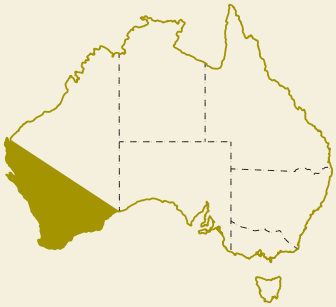


Southern Region characteristics include:

- temperate climate
- relatively low soil fertility
- yield dependency upon reliable spring rainfall
- smaller enterprise size
- diverse production patterns and opportunities
- large and diverse domestic markets
- phase farming innovation
- increases in intensive livestock production and demand for feed grains



## WESTERN REGION



Western Region characteristics include:

- Mediterranean climate
- low soil fertility
- yield dependency upon good winter rains as spring rainfall is generally unreliable
- large enterprise size
- narrower range of crop options
- dominant export market, smaller domestic market
- leading grain storage practice
- ease of transport access to South-East Asia

# Planning and reporting approach

The GRDC is a statutory corporation, operating as a research investment body on behalf of Australian graingrowers and the Australian Government. As well as its responsibilities under the PIERD Act, the corporation has accountability and reporting obligations set out in the *Commonwealth Authorities and Companies Act 1997* (CAC Act) and in the Commonwealth Authorities and Companies (Report of Operations) Orders 2005. The GRDC's portfolio department is the Australian Government Department of Agriculture, Fisheries and Forestry.

In line with its enabling legislation, the GRDC Board communicates its strategic directions and performance objectives through a five-year strategic plan that delivers:

- a statement of the GRDC's objectives and priorities
- an outline of the GRDC's strategies to achieve those objectives and priorities.

The current strategic document, *Driving Innovation*: The GRDC Five Year Research and Development Plan 2002–07, was approved by the Minister on 16 May 2002.

Each year's planned activities are outlined in operational terms in an annual operational plan, and in terms of an outcome-based performance measurement framework in the portfolio budget statements. Both documents are subject to approval by the Minister for Agriculture, Fisheries and Forestry. The GRDC's annual report details the corporation's achievements against its planned outcomes.

The GRDC's legal and policy drivers for action, outcomes to be achieved, detailed outputs and future directions are summarised in the performance framework shown in Figure 9.

The corporation uses the Australian National Audit Office *Guidelines for Best Practice Corporate Governance* to assess the corporation's overall approach and ongoing development. The GRDC's corporate governance in 2005–06 is discussed in detail in Part 3.

The GRDC continues to respond to the ministerial priorities for rural R&D corporations (RDCs) and to the Australian Government's National Research Priorities. These priorities, and the GRDC's achievements in meeting them so far, are discussed in more detail in Part 2.

Photo: Vic Dobos

## Strategic business plan—*The Way Forward*

In 2004 the GRDC conducted a significant strategy review that led to the release of the GRDC strategic business plan, *The Way Forward*, in January 2005. The plan is both supplementary and complementary to *Driving Innovation*, and encompasses issues highlighted in *Towards a Single Vision for the Australian Grains Industry*: the Australian Grains Industry Strategic Plan 2005–25.

*The Way Forward* also articulates the GRDC's responses to change in:

- the national and global agri-food sectors
- state-based departments of agriculture
- delivery channels to growers
- market penetration from competing countries
- input costs
- the profile of the Australian graingrower.

The strategic business plan identifies four principal pathways to market for R&D: better varieties faster; better farming practices adopted faster; new products; and building research capacity.

In 2005, as the first step towards implementing the strategic business plan, the GRDC reorganised its business structure to establish:

- four lines of business—Varieties, Practices, New Products and Communication and Customer Services—each of which corresponds to one of the strategic pathways to market and represents an output group for the purposes of reporting against our Annual Operational Plan 2005–06 and the Australian Government Department of Agriculture, Fisheries and Forestry Portfolio Budget Statements 2005–06.
- two enabling functions—Corporate Services, which covers human resources, finance, information technology, compliance and legal matters; and Corporate Strategy and Program Support, which covers strategy development and budget forecasting and provides program and panel support.

In other steps towards implementing *The Way Forward*, the GRDC has:

- developed separate investment strategies for each output group
- clearly identified two key customer groups—the Australian Government and Australian graingrowers
- improved communication between its key customer groups, research partners, Board, panel members and staff
- articulated the roles and responsibilities of the national and regional panels
- simplified and streamlined the corporation's procurement guidelines
- developed a comprehensive risk register, comprising strategic and operational risks, and provided quarterly 'traffic light' risk reports (identifying levels of risk as red, amber or green) to the Board
- selected an off-the-shelf project management system, to which business processes will be aligned.

*The GRDC's annual report details the corporation's achievements against its planned outcomes.*

**Figure 9 Performance framework**

## Drivers

**Australian Government's National Research Priorities + Rural R&D priorities + Ministerial directions**
Pages 25–29

***Driving Innovation*: The GRDC Five Year Research and Development Plan 2002–07 +**

## Activities
FOUR OUTPUT GROUPS, EACH WITH INVESTMENT STRATEGIES

### OUTPUT GROUP 1: VARIETIES

**Objectives:**

- To develop and commercialise new superior crop varieties with significantly enhanced production and market performance compared to current benchmark varieties in Australia
- To accelerate the rate of gain in key genetic traits of importance to the Australian grains industry
- To improve overall effectiveness and cost efficiency of GRDC-supported crop improvement programs in Australia

Page 30

### OUTPUT GROUP 2: PRACTICES

**Objectives:**

- To develop better farming practices and have them adopted faster
- To develop sustainable farming systems, adapted to each of the industry's agroecological regions, that are responsive to grower, community and catchment needs
- To develop and deliver cost-effective, robust and environmentally responsible solutions to current and potential crop threats

Page 39

## Performance indicators

- Crop variety testing—establishment of the National Variety Trials program in consultation with research partners and industry stakeholders
- Wheat breeding programs—achievement of key milestones for 2005–06
- Barley improvement—establishment of a nationally coordinated program for barley breeding, with strong market links
- Pulse improvement—establishment of a nationally coordinated program for field peas, chickpeas, lentils and faba beans, with strong market links
- Importation of new wheat germplasm—coordinate arrangements for the introduction and evaluation of CIMMYT germplasm for Australian breeding programs
- Genetic resources centres—establishment of a nationally coordinated project for the curation of crop and pasture plant species for Australian agriculture
- Major research programs—achievement of key milestones for 2005–06 for the Australian Centre for Plant Functional Genomics, Value Added Wheat CRC, Molecular Plant Breeding CRC, and Australian Winter Cereals Molecular Marker Program

- Implementation of a stratified survey to measure current on-farm practices such as the use of gypsum and lime for soil amelioration, controlled traffic, precision agriculture, variable rate technology, nutrient budgeting, risk management tools, the monitoring of water use and deep drainage, and the sowing of perennial pasture species
- Faster adoption of new practices, including targeted sustainable on-farm practices and technologies, by graingrowers
- Increased number of farmers involved in grower groups
- Enhanced management options for cereal foliar and root diseases across agroecological zones
- Increased farmer awareness and adoption of weed management practices that delay the development of herbicide resistance
- Identification of new approaches to crop protection, including the use of genetic manipulation of weeds, pathogens, invertebrate pests or crop hosts

## Outputs

- Establishment of National Variety Trials
- Establishment of Barley Breeding Australia
- Establishment of the National Pulse Breeding Program
- Establishment of the National Genetic Resources Centre
- Development of new, advanced germplasm
- Importation of new wheat germplasm
- Identification of significant genes
- Development of new breeding technologies
- Improvements in sorghum insect resistance
- Improvements in canola disease resistance
- Improvements in Australian peanuts
- Improvements in vetch versatility

- Demonstrating the benefits of zone farming
- Lifting crop water use efficiency
- Using new pasture legumes to improve nitrogen fixation
- Producing healthy yields by creating healthy soils
- Boosting northern farming systems by promoting chickpeas
- Managing weeds by integrating technologies
- Improving knowledge to better manage diseases of cereal crops
- Improving knowledge to better manage diseases of rotational crops
- Strengthening guidelines to protect Australia from new pest incursions

## Outcome

## Future

CIMMYT = the International Maize and Wheat Improvement Center, in Mexico; CRC = cooperative research centre.

**Industry priorities**
Pages 25–29

**Role of the GRDC described in the objects of the *Primary Industries and Energy Research and Development Act 1989*** Page 80

**Portfolio Budget Statements + Annual Operational Plan**

## OUTPUT GROUP 3: NEW PRODUCTS

**Objectives:**

- To develop innovative technologies, management practices and grain products that enhance grower profitability and the competitive performance of Australia's grain value chains

Page 51

- Commencement of a situational analysis of on-farm grain storage, taking into account the needs of growers, identifying storage options and the impacts that they could have on other value chain participants
- Collaboration with three or more value chain participants, ensuring that Australian grain participates more effectively in Asian markets
- Commercial evaluation and testing of biological inputs for profitable farming, enabling final commercialisation arrangements to be established
- Development of a business case for the commercialisation of a suite of new grain fumigants, and the commercialisation of these fumigants through to the negotiation of suitable licensing arrangements

- Gathering new product market intelligence
- Developing sustainable grain storage technologies
- Managing food safety risks
- Investigating new uses for grains

## OUTPUT GROUP 4: COMMUNICATION AND CUSTOMER SERVICES

**Objectives:**

- To deliver targeted and integrated information on research outputs arising from the GRDC's total R&D investment to all stakeholders
- To facilitate effective communication of the GRDC's R&D outcomes to all its identified customer segments
- To build critical mass in research capacity in collaboration with the GRDC's research partners that is able to maintain high-quality research standards and deliver against current and future needs of the Australian grains industry
- To identify the best means to attract and retain talented students and researchers in agricultural disciplines—such as breeding, agronomy and entomology—which benefit the grains industry

Page 57

- An increasing proportion of growers adopting new practices over the past two years due to GRDC activities, identified through an ongoing tracking survey of graingrowers
- An increasing level of customer satisfaction with GRDC organisational performance as a whole, and with the delivery of new and relevant information, products and services in particular, assessed by annual survey of GRDC stakeholders
- Greater utilisation of GRDC training and travel awards, and enhanced communication and extension of the knowledge and experiences gained
- Successful completion of an audit of skills, capabilities and research capacity presently available to support the domestic grains industry
- Publication of an audit report that accurately maps existing research capacity and identifies future needs, to include details of the levels and types of support available from all parties (the GRDC and research partners) that contribute to existing research capacity
- A new strategy in place to address the research capacity needs of the industry, specifying how research capacity is to be strengthened, by whom (responsibility) and by when (timeline); the milestones to be achieved along the way; and resourcing issues
- The research capacity requirements of GRDC stakeholders and research partners identified via consultation and incorporated into the new strategy

- Supporting industry skills development
- Delivering research information through the airwaves
- Nipping frost damage in the bud
- Building a learning industry
- Showcasing the co-investment model

**Through its commitment to innovation, an Australian grains industry that is profitable and environmentally sustainable for the benefit of the industry and wider community**

**The GRDC be recognised as the leader in setting, coordinating and facilitating a national grains R&D agenda driven by market signals that will enable graingrowers to compete on world markets, and deliver against Australian Government priorities**

# Report from the Chair and Managing Director

The year 2005–06 was one of mixed fortunes for Australian graingrowers. On the positive side, last season's harvest was the second highest on record. However, growers continued to face numerous challenges, including higher input costs due to rising oil prices, lower grain prices due to the continued strength of the Australian dollar, market penetration from competing countries, increasing labour shortages, and uncertainty in wheat marketing arising from the investigations of the Cole Inquiry.

These difficult production and market conditions highlight the need for national collaboration to drive R&D efforts further, to ensure that delivered outcomes enable Australian graingrowers to more effectively compete in the rapidly changing global grains industry.

## Grains industry production in 2005–06

The production of winter grains and oilseeds in 2005–06 was 40.5 million tonnes, an increase of just over five million tonnes or 14 percent from the 35.4 million tonnes produced in 2004–05. ABARE's June 2006 *Australian Crop Report* estimated that 2005–06 winter crop production in the two major crop-growing states was 14.2 million tonnes in Western Australia and 11.2 million tonnes in New South Wales, together accounting for 62.6 percent of total winter crop production in Australia.

Summer crop production in 2005–06 was 2.6 million tonnes, a decrease of 2.1 percent compared with 2.7 million tonnes produced in the previous year. For the major summer broadacre crop of sorghum, production fell by 7.6 percent to 2 million tonnes or 76.3 percent of summer crop production in 2005–06.

Growing season conditions were variable across New South Wales. The southern and central regions had the benefit of timely rainfall but in northern New South Wales dry conditions and hot temperatures affected crop growth and development.

## GRDC strategic business plan implementation

The primary objective of the GRDC's strategic business plan, *The Way Forward*, is to ensure that Australian graingrowers effectively compete in the global grains markets. The four core strategies to support this objective are to:

- coordinate a national portfolio approach to grains R&D
- deliver against Australian Government priorities
- grow and leverage total grains R&D
- ensure R&D is market driven.

In 2005, the GRDC reorganised its business structure to more effectively achieve these objectives, by targeting four pathways to market for grains R&D: better varieties faster; better farming practices adopted faster; new products; and building research capacity.

The new strategy and structure are effectively delivering results, as the sections on performance in Part 2 of this annual report confirm.

## GRDC achievements in 2005–06

GRDC achievements for 2005–06 include the successful establishment of National Variety Trials (NVT) across all the major grain-growing regions of Australia, national breeding programs for barley and pulses and a national approach to the management of the plant genetic resource centres. The new joint venture with Philom Bios Inc. of Canada, to commercially develop new soil inoculant products, will be particularly beneficial for cereal and canola growers in Australia. Part 2 of this report provides more details on these achievements, and on the outcomes of many other GRDC initiatives and ongoing projects.

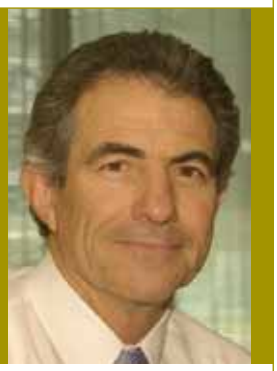
We are pleased to report that our annual survey of growers showed that Australian graingrowers remained satisfied with the GRDC's performance in 2005–06. It was pleasing to note there was a significant increase in the proportion of growers who rate the GRDC performance standard to be 'very high'. Growers are also becoming more aware of our regional panels, and taking the opportunity to interact with panel members more often.

## Challenges in 2006–07

The year ahead will bring new challenges and opportunities to the Australian grains industry and the GRDC.

Based on *The Way Forward*, the corporation will finalise its four output group strategies, and continue to implement the strategic business plan with strong emphasis on collaborating with other industry members and RDCs to enable the Australian grains industry to remain globally competitive. The corporation will undertake a comprehensive review of its business processes in order to improve efficiency and effectiveness.

*Terry J Enright*
*Chair*



*Peter F Reading*
*Managing Director*

The strategic business plan and the four output group strategies will be the building blocks of the corporation's next five-year plan (for 2007 to 2012), which will be finalised in 2006–07. The GRDC will continue to build relationships with customers and partners to enhance performance-driven focus on outcomes.

The GRDC's achievements depend on the effective and timely implementation of its strategies and the cooperation of the Board and panel members, our staff, our key customer groups and our R&D and delivery partners. We thank them for their significant contributions to grains industry R&D in 2005–06. We are pleased to note that our 2003–04 and 2004–05 annual reports have been recognised for their high quality, and commend this year's report to the reader.

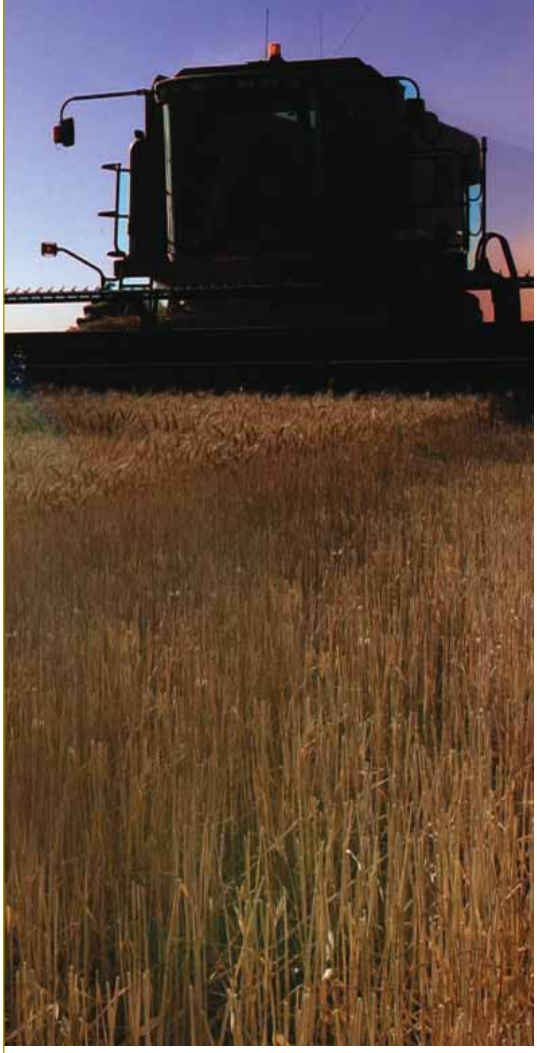
**Terry J Enright**
Chair

**Peter F Reading**
Managing Director

# Key achievements

The Grower Annual Indicator Survey 2006 showed that the corporation's overall performance rating (of 'very high' and 'fairly high') was unchanged in 2006, remaining at 74 percent. The proportion of growers rating GRDC performance as 'very high', however, rose for the first time since 2002.

The survey also showed that awareness of regional panels rose from 50 percent in 2005 to 58 percent in 2006, and that a higher proportion of growers interacted with panel members (up from 20 percent in 2005 to 23 percent in 2006).



Other noteworthy achievements for 2005–06 included:

- establishing the National Variety Trials (NVT), to provide nationally coordinated, independent and cost-effective information to Australian graingrowers on the performance of new crop varieties
- facilitating the formation of a single national barley-breeding program, Barley Breeding Australia
- facilitating the formation of a single national pulse-breeding program, made up of the GRDC, Pulse Australia and state government pulse-breeding agencies
- making substantial progress towards commercially sustainable, world-leading wheat-breeding programs as well as working with industry to improve End Point Royalty collection
- entering into a joint venture with Philom Bios Inc. of Canada to commercially develop new soil inoculant products and to make these available to cereal and canola growers in Australia as quickly and as cost effectively as possible
- improving the alignment between GRDC activities and the objectives of our key customer groups—the Australian Government and Australian graingrowers—as well as other stakeholders, including grower organisations and research partners
- collaborating with the International Maize and Wheat Improvement Center (CIMMYT) in Mexico to speed up the introduction of genetic material through all stages, from quarantine to evaluation to incorporation into Australian breeding programs, and maximise the adoption of superior traits
- cooperating with other RDCs and providing information to the Department of Agriculture, Fisheries and Forestry regarding the Australian Government's Uhrig-based review of the governance arrangements of all statutory authorities
- receiving a silver award for our 2004–05 annual report, at the Australasian Reporting Awards Fifty-sixth Annual Awards in June 2006.

# Significant events

## 27 June 2005

Senator the Hon. Richard Colbeck, then Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry, wrote to the Chair to formally approve the GRDC's Annual Operational Plan 2005–06.

## 31 August 2005

Senator Colbeck appointed Russell Phillips as the Government Director of the GRDC from 31 August 2005, following the resignation of Roland Pittar.

## 23 September 2005

Senator Colbeck wrote to the GRDC advising of the appointment of the nominated directors for the GRDC Board (two reappointed and four new) for a term commencing 1 October 2005 and ending 30 September 2008.

## 4 October 2005

The GRDC informed Senator Colbeck that it would become a member of Go Grains Health and Nutrition Ltd.

## 2 November 2005

Senator Colbeck wrote to the Chair to formally approve the GRDC's Annual Report 2004–05 for tabling. The report was tabled in parliament on 8 November 2005.

## 29 November 2005

Senator Colbeck appointed Ross Johns as Deputy Chair of the GRDC for the duration of his appointment as a director.

## 21 December 2005

The GRDC informed Senator Colbeck of its proposed involvement in a company to develop high-amylose wheat with CSIRO and Groupe Limagrain.

## 27 January 2006

The Hon. Sussan Ley, MP, was sworn in as Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry, succeeding Senator the Hon. Richard Colbeck.

## 22 February 2006

The GRDC informed the Hon. Sussan Ley, MP, Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry, that it proposed to join with Philom Bios Inc. in the formation of an Australian company, Philom Bios (Australia) Pty Ltd.

## 4 to 7 April 2006

Grains Week—the annual conference of the Australian grains industry—was held in Canberra.

## 21 June 2006

The Hon. Sussan Ley, MP, wrote to the Chair to formally approve the GRDC's Annual Operational Plan 2006–07.

PART TWO

# Our Outputs

# Corporate performance

The GRDC's overall performance against the corporate objectives set out in *Driving Innovation* is assessed each year using formal surveys and analyses. A summary of that performance is provided in Table 2.

This year, data is based on *GRDC Organisational Performance Research—Year 3 Survey*, dated April 2006, by Ipsos Australia, and *Australian Grains Industry 2005 and 2006*, published by the Australian Bureau of Agricultural and Resource Economics (ABARE). In 2006, Ipsos Australia conducted a national telephone survey of 1,151 Australian growers.

**Table 2 Performance in meeting corporate objectives, 2005–06**

**Product and service delivery objective:**

**Deliver products and services to growers in support of their business objectives and within the context of the Australian Government's stated priorities**

| Indicator | Performance |
|---|---|
| Annual survey of growers regarding:<br>• innovation indexes (including uptake of new varieties)<br>• grower attribution of benefit to R&D | Of the 1,151 growers surveyed by Ipsos Australia in 2006:<br>• 71% had grown new wheat varieties in the past five years—showing a slight drop from the figure of 72% of all growers surveyed in 2005<br>• 41% had grown new barley varieties in the past five years—no change from 2005<br>• 18% had grown new oat varieties in the past five years—a slight drop from 22% in 2005<br>• 9% had grown new triticale varieties in the past five years—a slight increase from 7% in 2005<br>• 35% had grown new varieties of pulses in the past five years—a slight increase from 27% in 2005<br>• 34% had grown new varieties of oilseeds in the past five years—unchanged from 2005<br>• 11% had grown new varieties of sorghum in the past five years—a slight decrease from 12% in 2005<br>• 59% of growers felt that the new varieties met expectations—a slight increase from 58% in 2005<br>• nine in ten (89%) claimed to use variety information or yield data for decision-making purposes<br>• 77% believed that they had directly benefited from grains R&D in the past five years—the same percentage as in 2005<br>• 68% believed that they had benefited from GRDC activities in the past five years—a slight increase from 66% in 2005.<br>The survey also showed that GRDC continues to have a greater influence in the adoption of actions relating to long-term sustainability on the farm—up from 40% in 2005 to 45% in 2006. |

**Table 2 Performance in meeting corporate objectives, 2005–06** *(continued)*

**Product and service delivery objective:**

**Deliver products and services to growers in support of their business objectives and within the context of the Australian Government's stated priorities**

| Indicator | Performance |
|---|---|
| Specific farming practice changes | Of the growers surveyed in 2006, 79% claimed to have taken actions to adopt new or improved farming practices.<br>Adoption levels of innovative farm practices included:<br>• gypsum—49%<br>• lime—39%<br>• controlled traffic—20%<br>• variable rate technology—20%<br>• other precision agriculture (such as GPS guidance, direct drill or yield mapping)—29%<br>• nutrient budgeting—54%<br>• risk management tools—27%<br>• monitoring available water content—32%<br>• monitoring depth to the water table—24%.<br>Of the growers surveyed in 2006, 89% were undertaking activities or initiatives to ensure the long-term sustainability of their farms. |
| Whole-of-portfolio economic analyses | A prospective economic analysis of the GRDC's investment portfolio was completed at the beginning of the five-year planning period. Results indicated that grains R&D would deliver an overall benefit–cost ratio of 6.6:1, based on conservative assumptions. When account is taken of benefits flowing to off-farm businesses, the benefit–cost ratio increases to 7.8:1. This equates to a net present value of about $3 billion flowing to the wider community through grains R&D. |
| Improvement in the performance of the grains industry, measured by ABARE analysis of industry performance across the agroecological zones | Farm cash income (net of cash costs, and average per farm) is estimated to have decreased to $76,376 in 2004–05, from $137,469 in 2003–04 as adverse seasonal conditions in 2004–05 restricted grain yields in most states. However, the provisional estimate for farm cash income in 2005–06 has rebounded to $90,227, after yields were more than 30 percent higher and wheat production was estimated to have risen by 27 percent in 2005–06 compared to the previous season. These results highlight the variability in farm cash income from year to year depending on seasonal conditions.<br>The rate of return* (including capital appreciation) fell to 6.5 percent in 2004–05, from 11.5 percent in 2003–04. |

* Latest estimated rates of return (including capital appreciation) available for Australian farms, from April 2006 ABARE report, *Grains Industry: Financial Performance of Farms in 2005–06*.

**Table 2 Performance in meeting corporate objectives, 2005–06** *(continued)*

**Relationship management objective:**

**Build, lead and manage relationships to optimise benefits to stakeholders**

| Indicator | Performance |
|---|---|
| Assessment of innovation and flexibility in contractual relationship development with partners, strategic alliances and providers | During the year the GRDC put in place new arrangements to enhance the utilisation of new genetic material from the International Maize and Wheat Improvement Center (CIMMYT), in Mexico.<br>These include:<br>• sponsoring breeders from all major Australian wheat-breeding programs to make regular visits to Mexico to collectively select novel germplasm for importation into Australia<br>• field testing selected germplasm in different Australian environments, and reporting the test results to breeders and to CIMMYT<br>• maintaining seed of all imported germplasm<br>• distributing seed upon request to interested breeders.<br>In 2005–06, the GRDC facilitated the formation of a national barley-breeding program, Barley Breeding Australia (BBA). The new program integrates six state-based barley-breeding programs into a single national program with three regional breeding nodes. BBA will commence operations in 2006–07. The new structure will allow for more efficient resource allocation, enhanced collaboration between breeders, and greater focus on meeting domestic and international targets in feed and malting barley markets. |
| Evidence of intellectual property of significant value generated over the life of *Driving Innovation* | This will be measured at the end of the five-year period covered by the plan. |

**Compliance objective:**

**Ensure corporate compliance with all statutory and legal requirements**

| Indicator | Performance |
|---|---|
| Ongoing endorsement by the minister of statutory corporate planning and reporting documents | In 2005–06, the minister endorsed the GRDC Portfolio Budget Statements 2006–07 and the Annual Operational Plan 2006–07. |

# Collaboration

The GRDC is usually only one of a number of public and/or private organisations investing in the development of new technologies for the grains industry. The GRDC collaborates with other organisations to increase the return on its investment and deliver greater benefits to Australian graingrowers than would be possible if the GRDC operated alone. Partnerships enable investors to share financial resources and research capability, as well as other benefits such as market knowledge and access to complementary technologies and intellectual property. They also reduce the risk faced by each organisation.

## RDC collaborations

In 2005–06, the Chair of the GRDC served as head of the Council of Research & Development Corporation Chairs, which brings together all the chairs of Australian rural research and development corporations (RDCs) to identify and pursue areas of common interest.

The GRDC also strengthened its strategic and operational relationships with the other RDCs by sharing corporate expertise in other ways. For example, the GRDC:

- made presentations on *The Way Forward*, the GRDC's strategic business plan, before the Chairs Working Group and the Board of the Sugar RDC
- shared the GRDC template for addressing issues raised in the Uhrig Review with all other RDCs
- coordinated a joint RDC response to the Department of Finance and Administration on proposed changes to the *Commonwealth Authorities and Companies Act 1997* (CAC Act) and related legislative instruments
- provided input to the Meat and Livestock Australia (MLA) *Livestock Production Research and Development Strategic Plan 2006–2011*
- shared the GRDC's format for monthly reporting with the Rural Industries RDC (RIRDC)
- shared the GRDC's organisational competencies and performance appraisal processes with the Fisheries RDC
- contributed to joint presentations to government advisory bodies, such as the
  - — Agriculture and Food Policy Reference Group
  - — Natural Resource Management Working Group
  - — Coalition Backbench Committee on Agriculture, Fisheries and Forestry.

In September 2005 at Parliament House, RDCs jointly presented *Rewards from Innovation—World's Best Food and Fibre*, showcasing the achievements of cooperative industry–government R&D. The GRDC took part in the event, and in follow-up activities that included planning an RDC communication strategy for 2006–07; establishing an RDC program managers forum; and establishing an RDC business managers forum.

To ensure their R&D outcomes are effectively communicated to a wide range of stakeholders, several organisations, including the GRDC, Land and Water Australia, MLA, the Australian Bureau of Statistics, CSIRO, the RIRDC, the Bureau of Rural Sciences, the Australian Government Department of the Environment and Heritage and the Australia New Zealand Land Information Council are working together to develop a 'one-stop knowledge shop' for natural resource management.

In 2005–06, the GRDC was also an investment partner in a number of joint research projects, including:

- the Grain and Graze Program
- the Joint Centre for Farm Health and Safety
- the Managing Climate Variability Program
- the National Annual Pasture Legume Improvement Program
- Pastures Australia
- the Pasture Soil Biology Program
- the Premium Grains for Livestock Program
- a pulse transformation and technology transfer project.

Further details of these and other collaborative projects, including the research partners involved, are provided in Appendix 3.

## International collaborations

### Alliances

In 2005–06, the GRDC maintained two very valuable alliances with international centres for crop improvement:

- a contractual relationship, and investments, with the International Maize and Wheat Improvement Center (CIMMYT) in Mexico—this relationship has made significant long-term contributions to the productivity and sustainability of the Australian wheat industry
- a strategic alliance with the International Centre for Research Into the Dry Areas (ICARDA) in Syria—this year, a management package was developed to minimise the impact of disease in chickpeas by screening a large number of chickpea lines at ICARDA.

### Treaties

Australia is in the process of ratifying the International Treaty on Plant Genetic Resources for Food and Agriculture. In 2005–06, the GRDC put in place a new, three-year national program, entitled Plant Genetic Resources, to support the formation of a National Genetic Resource Centre.

Australia is also in the process of acceding to the Establishment Agreement of the Global Crop Diversity Trust, an international treaty-level agreement. The objective of the trust is to provide a permanent source of funds to support the long-term conservation of germplasm on which the world depends for food security. The GRDC contributed $1.18 million to the trust in 2005–06 and will continue to support it into the future.

*ICARDA senior entomologist Dr Mustapha El-Bouhssini (left) and the GRDC's Richard Brettell and GRDC Chair Terry Enright (right), discussing resistance testing at ICARDA.*

*In June, the GRDC hosted a 20-person Chilean delegation consisting of growers, quality advisers, millers, researchers and agricultural and business advisers.* Photo: Vic Dobos

### Investment

The GRDC has a 22 percent shareholding in the Australian Centre for Plant Functional Genomics Pty Ltd (ACPFG). ACPFG has signed a major research agreement with Pioneer Hi-Bred International Inc.—one of the world's biggest maize-breeding companies, based in the United States. The agreement, the first deal with a large United States commercial company, will bring $2.3 million in research investment to Australia with the opportunity to access the best international crop science available.

### Delegations

In 2005–06, the GRDC hosted a number of international delegations, mainly from countries with well-established grains industries. Through such visits, the delegations learn about Australia's industry–government collaborative approach to R&D, while the GRDC gathers first-hand information about the industry drivers in other countries.

Particularly noteworthy were high-level visits by:

- a 16-person delegation from Canada, which visited the GRDC in November 2005
- a three-person delegation from the Korean Agriculture R&D Promotion Center, which visited the GRDC in November 2005
- a delegation including the President of the National Farmers Federation of Chile and the Ambassador of Chile in Australia, which visited the GRDC in January 2006
- a three-person delegation from Kazakhstan, including an adviser to the Prime Minister of Kazakhstan, which visited the GRDC in May 2006
- the 20-person Chilean Farmer Delegation, including graingrowers, quality advisers, millers, researchers, and agricultural and business advisers, which visited the GRDC in June 2006.

# Research priorities

Each year the GRDC tailors its investment portfolio, and its Annual Operational Plan, to best address the research priorities identified by its key customers: the Australian Government and Australian graingrowers.

The GRDC's R&D portfolio is linked to the Australian Government's:

- National Research Priorities, as outlined by the Prime Minister in December 2002
- priorities for rural R&D, as announced by the Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry in March 2003.

The GRDC identified Australian graingrowers' R&D priorities for 2002–07 during the development of *Driving Innovation*, through consultations with the Grains Council of Australia (GCA) and graingrower workshops.

Table 3 shows the relationships between government and industry research priorities, while Table 4 shows how the GRDC achieved results in relation to these priorities during 2005–06.

The breakdown of expenditure allocated to addressing the Australian Government's research priorities during the 2005–06 financial year appears in more detail in Appendix 1.

*Grain and Graze, a joint initiative of the GRDC, MLA, AWI and LWA is assisting mixed farmers across southern Australia to increase the profitability of producing crops and livestock while better managing water, soil and biodiversity.*

**Table 3 Industry and government research priorities**

| Australian graingrowers' priorities | Australian Government's National Research Priorities (NRPs) | Ministerial priorities for rural R&D corporations and companies (RRDPs) |
|---|---|---|
| Industry 1: Sustainability and resource management:<br>• farming systems and rotations to protect and enhance the soil and water resource base<br>• genetic improvement for sustainability | NRP 1: An environmentally sustainable Australia | RRDP 1: Sustainable natural resource management |
| Industry 2: New and innovative product development:<br>• identify premium markets to enhance grower returns<br>• ensure flow of market signals | NRP 2: Promoting and maintaining good health | RRDP 2: Improving competitiveness through a whole-of-industry approach<br>RRDP 3: Maintaining and improving confidence in the integrity of Australian agricultural, food, fish and forestry products |
| Industry 3: Develop new alliances and links to market | | RRDP 4: Improved trade and market access |
| Industry 4: Bringing biotechnology to bear on sustainability and consumer benefit outcomes, to support profitable farming systems and access to premium markets<br>Industry 7: Effective and targeted transfer and adoption of technology and knowledge for Australian growers | NRP 3: Frontier technologies for building and transforming Australian industries | RRDP 5: Use of frontier technologies<br>RRDP 7: Creating an innovative culture |
| Industry 5: Genetic improvement and regional adaptation of new grain varieties:<br>• improved resistance to biotic and abiotic stress<br>• quality standards for specific end uses | | |
| Industry 6: Integrated pest management:<br>• to minimise total costs of pests, diseases and weeds<br>• to maintain options and control strategies | NRP 4: Safeguarding Australia | RRDP 6: Protecting Australia from invasive diseases and pests |
| Industry 8: Independent variety evaluation | | |

**Table 4 GRDC achievements against stakeholder priorities in 2005–06**

| Priorities | Relevant new GRDC investments |
|---|---|
| **Industry 1:**<br>Sustainability and resource management:<br>• farming systems and rotations to protect and enhance the soil and water resource base<br>• genetic improvement for sustainability<br>**NRP 1:**<br>An environmentally sustainable Australia<br>**RRDP 1:**<br>Sustainable natural resource management | To improve the sustainability of farming operations, the GRDC supported projects with a particular emphasis on:<br>• developing and communicating precision agriculture and zone cropping methods<br>• communicating the findings of the Soil Biology Initiative through better soil management packages<br>• identifying priority areas to assist in lifting grain yields closer to potential water-limited yield across agroecological zones and statistical local areas<br>• identifying economic options for the removal of subsoil constraints<br>• improving understanding of the drivers of climate variability, through the Managing Climate Variability Program<br>• developing and communicating management packages for pulses and oilseeds<br>• communicating methods for the measurement of crop water use<br>• developing strategies to achieve high cereal yields in rotation with cotton<br>• developing approaches to better integrate livestock into cropping systems, through the Grain and Graze Program. |
| **Industry 2:**<br>New and innovative product development:<br>• identify premium markets to enhance grower returns<br>• ensure flow of market signals<br>**NRP 2:**<br>Promoting and maintaining good health<br>**RRDP 2:**<br>Improving competitiveness through a whole-of-industry approach<br>**RRDP 3:**<br>Maintaining and improving confidence in the integrity of Australian agricultural, food, fish and forestry products | GRDC investments to improve the industry's competitiveness in new markets included:<br>• a study to identify the most suitable oilseed crops to be used as a platform for the development of industrial oils from the CSIRO–GRDC Crop Biofactories Initiative<br>• a study to identify commercial opportunities in the developing biofuels industry in Australia and North America<br>• a collaborative project with animal industries to improve the use and value of feed grains by creating calibrations to determine the digestible energy in grain<br>• Cooperative Research Centre (CRC) for Innovative Grain Food Products projects on Bioprocessing, Healthy Foods and Fibre, and Fodder to Food<br>• a project to identify potential economic benefits from novel oilseeds with altered oil profiles for use in the human food and animal feed markets.<br>The GRDC also supported research to:<br>• develop objective grain quality testing technologies, such as an on-farm, near-infrared spectroscopy (NIR) moisture meter<br>• manage the quality of barley in storage<br>• develop leading-edge technologies to assess grain quality at receival<br>• develop a risk assessment and other strategies for the management of mycotoxins in maize<br>• establish the 'no observable effect' levels of common toxins found in grains. |
| **Industry 3:**<br>Develop new alliances and links to market<br>**RRDP 4:**<br>Improved trade and market access | GRDC activities to foster market alliances included:<br>• establishing a jointly owned company, Philom Bios (Australia) Pty Ltd, to commercialise a range of new soil inoculants<br>• agreeing to enter into an incorporated joint venture with CSIRO and Groupe Limagrain of France to complete the development and commercialisation of high-amylose wheat. |

**Table 4 GRDC achievements against stakeholder priorities in 2005–06** *(continued)*

| Priorities | Relevant new GRDC investments |
|---|---|
| **Industry 4:**<br>Bringing biotechnology to bear on sustainability and consumer benefit outcomes, to support profitable farming systems and access to premium markets<br>**NRP 3:**<br>Frontier technologies for building and transforming Australian industries<br>**RRDP 5:**<br>Use of frontier technologies<br>**RRDP 7:**<br>Creating an innovative culture | GRDC support for the exploration of frontier technologies included:<br>• work by the Australian Winter Cereals Molecular Marker Program, focusing on the validation and implementation of markers for wheat and barley breeding<br>• research to discover genes for plant improvement and crop protection, through basic/strategic research projects that included partnerships in the Australian Centre for Plant Functional Genomics and the Grain Protection Genes program to develop novel approaches to abiotic and biotic stresses respectively<br>• work by the Molecular Plant Breeding CRC and the Value Added Wheat CRC to further enhance the technological base for cereal crop improvement.<br>The GRDC also commissioned a technology and market assessment study to identify investment opportunities and potential partners to develop technologies to assist growers to analyse soil and grain properties on-farm. This is in addition to ongoing work to further develop objective grain quality testing technologies, such as an on-farm NIR moisture meter. |
| **Industry 5:**<br>Genetic improvement and regional adaptation of new grain varieties:<br>• improved resistance to biotic and abiotic stress<br>• quality standards for specific end uses | The GRDC's investments in breeding programs for cereals, oilseeds and pulses delivered new varieties with enhanced performance:<br>• Ten new varieties of wheat with increased yield, disease and pest resistance, and tolerance to abiotic stresses, as well as improved quality and agronomic attributes, were made available to growers<br>• Six new malt varieties and two new feed varieties of wheat were released. One example, Flagship, was bred specifically for the large brewing and malting market in South-East Asia, China and Japan<br>• Two speciality high-oleic, low-linolenic (HOLL) canola cultivars were released—HOLL varieties produce oil with relatively low levels of unsaturated fats and enhanced frying stability<br>• The sorghum-breeding program developed germplasm with increased genetic diversity, improved grain quality and significantly improved resistance to sorghum midge, drought and disease<br>• The pulse-breeding program released several new varieties with higher yield, superior quality and improved disease resistance. |
| **Industry 6:**<br>Integrated pest management:<br>• to minimise total costs of pests, diseases and weeds<br>• to maintain options and control strategies<br>**NRP 4:**<br>Safeguarding Australia<br>**RRDP 6:**<br>Protecting Australia from invasive diseases and pests | The GRDC continued to support research to develop integrated approaches to the management of weeds, diseases and pests, and to communicate successful methods to growers. For example, a series of integrated weed management workshops demonstrated collaboration between the GRDC, the CRC for Australian Weed Management and a range of industry participants to promote effective and sustainable weed management practices.<br>As a result of the GRDC's support for Plant Health Australia, protocols were set in place for the preparation of contingency plans for the highest priority emergency plant pests considered most likely to gain entry to Australia and affect the grains industry. Fifteen such plans will be completed in the next three years. |

**Table 4 GRDC achievements against stakeholder priorities in 2005–06** *(continued)*

| Priorities | Relevant new GRDC investments |
|---|---|
| **Industry 6:** *(continued)* | With the support of Plant Health Australia, the CRC for National Plant Biosecurity and the GRDC, the New South Wales Department of Primary Industries developed a new, highly accurate molecular test for Karnal bunt. Misidentification of this disease in Pakistan threatened Australian exports in 2004, and the new test was developed to prevent such an emergency from re-occurring. The test will reduce the time taken to accurately identify the disease from two weeks to less than one day.<br><br>A license option agreement was put in place between CSIRO (on behalf of the GRDC and the other co-owners of the technology) and BOC Ltd to undertake the evaluation and registration of carbonyl sulphide and ethyl formate for use as grain fumigants. |
| **Industry 7:**<br>Effective and targeted transfer and adoption of technology and knowledge for Australian growers<br><br>**RRDP 7:**<br>Creating an innovative culture | Mechanisms in place to deliver targeted information to meet stakeholder needs included:<br>• a communication plan, developed and implemented in collaboration with the National Variety Trials (NVT) service provider, the Australian Crop Accreditation System, to deliver the first year's results from the NVT—this included development of the website www.nvtonline.com.au<br>• grower and adviser research updates, involving GRDC-funded researchers and international speakers, to transfer knowledge on investment outputs<br>• 18 grower workshops, conducted across Australia by the Australian Centre for Intellectual Property in Agriculture, to raise awareness and understanding of plant breeder's rights, End Point Royalties (EPRs) and related contractual issues.<br><br>Information, products and services developed for the GRDC's customers included:<br>• a joint project with the Kondinin Group to revise *The Wheat Book*, an educational resource for children aged between ten and 14 years<br>• an audio CD presenting the latest grains industry technical and agronomic information from the 2005 GRDC research update series, targeting over 1,000 advisers and industry specialists<br>• *Driving Agronomy*, an audio CD on new research initiatives, distributed to over 38,000 growers and advisers<br>• a booklet on cereal growth stages that includes management strategies for disease control and canopy management<br>• maize and sorghum *Ute Guides* for growers in the Northern Region. |
| **Industry 8:**<br>Independent variety evaluation | • NVT were successfully established across all the major grain-growing regions of Australia. Variety data for ten winter crops (including wheat, barley and canola) from 482 GRDC-funded trials were processed. Trial results are published online at www.nvtonline.com.au. |

**Notes:** ' Industry' priorities are the eight grains industry priorities identified through consultation.

' NRP' priorities are the Australian Government's four National Research Priorities.

' RRDP' priorities are the seven ministerial priorities for rural R&D corporations and companies.

'Statistical local area' is the base spatial unit used used by the Australian Bureau of Statistics to collect and disseminate statistics other than those collected from the Population Censuses.

# Output Group 1: Varieties

## Objectives

- **To develop and commercialise new superior crop varieties with significantly enhanced production and market performance compared to current benchmark varieties in Australia**
- **To accelerate the rate of gain in key genetic traits of importance to the Australian grains industry**
- **To improve overall effectiveness and cost efficiency of GRDC-supported crop improvement programs in Australia**

## Overview

The Varieties output group reaches across the GRDC's 25 leviable crops, spanning cereal crops (including wheat and barley), summer coarse grains, pulses and oilseeds. It supports crop improvement for domestic and export industries based on grain, with the aim of raising the overall value of the Australian grains industry.

The output group includes GRDC investments in gene discovery, breeding technologies, functional genomics, germplasm enhancement, genetic transformation, plant breeding, crop variety testing, grain quality research, and plant pathology (where directly related to breeding).

The continuing prosperity of the industry depends on the development of new varieties with enhanced yields as well as quality attributes that add value and meet market demands. The latter is being achieved by collaborating with grain marketers and bulk handlers to clarify end-user requirements.

Growing superior high-yielding varieties using optimal systems for crop management will lead to increased productivity. The search for new sources of disease resistance to incorporate into crop plants continues, alongside research to improve the understanding of the processes involved in resistance breakdown.

## Inputs

In total, $55.10 million was invested through the Varieties output group in 2005–06.

In addition, the Varieties output group attracted significant co-investment from its research partners. We also relied on the skills and expertise of the people within our partner organisations.

## Outputs

**Establishment of National Variety Trials**

Australian graingrowers have been asking for independent information on the performance of crop varieties to help them decide which varieties to plant in the new season. Independent information on variety performance is also essential to accelerate the rate of adoption of new varieties.

During 2005–06, the GRDC-supported National Variety Trials (NVT) were successfully established across all the major grain-growing regions of Australia. Variety data for ten winter crops (including wheat, barley and canola), from 482 GRDC-funded trials, were processed. The trial results are owned by the GRDC and published online at www.nvtonline.com.au.

NVT now provide growers with independent information on the performance of new varieties. The trials give growers the ability to compare new releases from all participating breeding programs, and give breeders the opportunity to benchmark themselves against competitors.


*Across the nation: the spread of National Variety Trials sites.*

### Establishment of Barley Breeding Australia

A national barley-breeding program, Barley Breeding Australia (BBA), was established in 2005–06 and will commence operations in 2006–07. The program restructures six state-based barley-breeding programs into one national program with three regional breeding nodes.

The GRDC has formed a strong working relationship with the barley industry's peak body, Barley Australia. Strong links with Barley Australia, feed grain users and growers will ensure that the breeding program has access to the right market signals.

The establishment of BBA will help to prevent intellectual property issues from impeding cultivar development, giving breeders freedom to share germplasm, markers and software. BBA will also establish benchmarks and key performance indicators to monitor its performance.

### Establishment of the National Pulse Breeding Program

Australian temperate farming systems are highly reliant on cereals. Viable rotation crops are essential to improve the overall profitability, sustainability and diversity of these cereal-based farming systems. One option is the inclusion of a profitable pulse crop. Pulses have a very important role in the farming system, in that they provide a disease break for following cereal crops, greatly reduce nitrogen fertiliser inputs, and provide an opportunity to manage herbicide resistance.

In partnership with key research providers, the GRDC has established a National Pulse Breeding Program (NPBP) that unites the field pea, chickpea, faba bean and lentil breeding programs. The new NPBP brings together the major state government pulse-breeding agencies, Pulse Australia and the GRDC into a coordinated, national endeavour. This program operates across five states for the benefit of Australian growers, most of whom depend on pulses as part of their cereal rotation and as cash crops.

The NPBP ensures that the respective breeding programs now share germplasm, technologies and intellectual property so that benefits flow freely across the states, and their outcomes meet the regional needs of growers, marketers and buyers.

*Barley breeding at SARDI.* Photo: Brad Collis

By maximising national resources and reducing duplication and fragmentation the individual breeding programs are:

- ensuring the expansion of the pulse industry through efficient and collaborative research
- coordinating at a national level the introduction and evaluation of new germplasm to overcome constraints including frost, diseases and pests, and hostile soils
- developing new varieties from one breeding program using extensive regional evaluations
- facilitating germplasm enhancement that addresses key agreed traits
- rationalising grain quality analyses
- implementing new technologies that may lead to the development of valuable new traits.

*Technical officer Steve Murden (left) and researcher Michael Materne during last year's harvest of chickpea trials at the DPI Victoria trial site at Horsham.* Photo: Brad Collis

### Establishment of the National Genetic Resources Centre

The GRDC is supporting improvements in the curation of Australia's collections of plant genetic resources. In 2005–06, together with Australian Wool Innovation Ltd, state governments and the Australian Government, the GRDC supported the process to rationalise the five state-based genetic resource centres into the National Genetic Resources Centre. The new centre will be established in late 2006.

### Development of world-leading wheat-breeding programs

During the past 12 months the GRDC has worked closely with the new and established wheat-breeding programs to help facilitate a smooth transition to commercially sustainable world-leading wheat-breeding programs.

The GRDC is also working with industry to improve EPR collection efficiency, which is critical to the success of a self-sustaining wheat-breeding sector.

### Development of new, advanced germplasm

Through the Varieties output group, the GRDC supports grain quality research, in partnership with other sectors of the grains industry.

For wheat, during 2005–06 the GRDC worked closely with AWB International to develop a strategy for addressing quality issues that are important for securing valuable export markets in Asia. Specific investments were made in research directed at enhancing qualities required for producing noodles and for making bread using the sponge and dough process that has been widely adopted in overseas markets.

For barley, the GRDC and Barley Australia worked together to foster a 'whole-of-industry' approach to barley quality improvement.

Investment in research to better understand the genetics of host–pathogen interactions and screen for disease resistance continued to contribute to the development of new cultivars with improved resistance to root and leaf diseases. The GRDC's long-term support for the Australian Cereal Rust Control Program aims to ensure that Australian growers remain protected against losses from disease. Routine screening tests on over 97,000 cereal lines, detailed tests on 513 lines, and further tests on 301 elite lines were completed this year. Some 3,000 wheat backcross derivatives were returned to breeders for further development.

A collaborative project involving the New South Wales Department of Primary Industries, the Queensland Department of Primary Industries and Fisheries and the National Durum Breeding Program at Tamworth, New South Wales, is validating and developing new sources of resistance to crown rot, a disease that seriously constrains the expansion of the durum industry in Australia. In 2005–06, 17 Japanese bread wheat lines with reported resistance to the disease were tested under Australian conditions, and the two best performers were crossed with Australian material for further assessment and development.

### Importation of new wheat germplasm

The introduction and development of novel germplasm is recognised as a critically important component of breeding new varieties. To make effective use of existing genetic variation, the GRDC has been building on international collaborations that have already made major contributions to the long-term productivity and sustainability of the Australian grains industry.

This year the GRDC put in place new arrangements to coordinate the introduction and evaluation of new genetic material from the International Maize and Wheat Improvement Center (CIMMYT) in Mexico. In addition, a new alliance was developed with the International Centre for Agricultural Research in the Dry Areas (ICARDA), based in Syria, identified as having a strategic fit with the GRDC in the quest for improved cereal and pulse varieties for challenging agricultural environments.

*Researcher Robert Park outside the microclimate rooms used for screening cereal lines with important rust pathotypes.*
Photo: Brad Collis

### Identification of significant genes

The discovery of new genetic sources of rust resistance continues through a number of GRDC-funded projects.

Research at the University of Adelaide has identified novel genes for stem rust resistance from uncultivated relatives of wheat and has recombined a number of these genes in wheat germplasm backgrounds. In 2005–06, the resulting rust-resistant recombinant lines were tested by the Australian Cereal Rust Control Program and sent to wheat-breeding companies in New South Wales, Queensland, Western Australia and South Australia for further testing and development.

### Development of new breeding technologies

New technologies that can speed up the process of delivering new cereal varieties are being developed as a result of continuing investment in molecular biology research.

The Australian Winter Cereals Molecular Marker Program was extended for three years from July 2004, with emphasis on the validation and implementation of markers for wheat and barley breeding. This world-leading marker program has had significant impact on breeding programs in Australia.

The GRDC also supported gene discovery for plant improvement and crop protection, through research projects that include partnerships with the Australian Centre for Plant Functional Genomics and the Grain Protection Genes program to develop novel approaches to abiotic stress and biotic stress respectively. Investment was also made in two cooperative research centres (CRCs), the Molecular Plant Breeding CRC and the Value Added Wheat CRC, to further enhance the technological base for cereal crop improvement.

### Improvements in sorghum insect resistance

The sorghum-breeding program develops germplasm to increase genetic diversity (resulting in increased crop security) and to combine increased yield potential with key traits such as improved grain quality and resistance to sorghum midge, drought and disease. The material is licensed to the seed industry for use in breeding programs.

A key achievement of the program has been the development of germplasm with levels of midge resistance such that it would rarely be economic for growers to spray for midge. An integrated pest management system has been developed combining midge-resistant hybrids and Gemstar (a virus to control heliothis). This system allows the build-up of natural predatory insects and results in chemical-free control of insects in sorghum. The economic benefit of this system is around $20 million a year, and significant environmental benefits are also achieved through the reduction in chemical use.

### Improvements in canola disease resistance

Blackleg caused by *Leptosphaeria maculans* and stem rot caused by *Sclerotinia sclerotiorum* are two fungal diseases that use different strategies to invade canola. Blackleg is specific to brassicas and related species. *Sclerotinia* has a broad host range and produces toxins and other factors that kill plant cells and cause rapid lesion formation.

A research team at the University of Melbourne is investigating these diseases and their relationships with the host plant at the molecular level to develop more robust genetic resistance in commercial cultivars.

The team has identified—and, in some cases, characterised—several genes in the blackleg and stem rot fungi that are active during infection and may present good targets for inhibition through either genetic manipulation of the host plant or application of novel fungicides.

Field studies of the variability of the blackleg pathogen have shown that the disease responds by changing its genetic makeup according to the spatial distribution of existing cultivars with differing genetic resistance. This finding strongly suggests that strategic deployment of genetic resistance has the potential to be used as another weapon in staying one step ahead of the disease.

*Female midge.*

*Blackleg is the most damaging disease of canola worldwide.*

**Improvements in Australian peanuts**

Prior to 1994, varieties introduced from overseas dominated peanut releases in Australia. Since 1994 there has been a steady flow of locally bred releases, with a focus on market requirements such as high oleic oil content for enhanced shelf life and health benefits for consumers. With GRDC support, the Queensland Department of Primary Industries and Fisheries breeding program at Kingaroy has been able to 'stack' additional traits into three new high-oleic varieties, which will provide further advantages to Australian growers by stabilising yields and lowering production costs.

A considerable proportion of the Australian peanut production area is rainfed, in environments with erratic rainfall. The availability of a much earlier maturing variety means that growers can now be assured of achieving a viable yield even under extreme drought conditions. The new variety also provides a greater range of sowing dates, giving dryland growers the opportunity to further spread their risk.

*Kingaroy peanut grower Wayne Weller checking on maturity in threshed peanuts.* Photo: Rebecca Thyer

Fungal leaf diseases such as leaf spot and leaf rust also significantly affect peanut yield and quality, especially in the wetter, more humid production environments. In these regions the cost of foliar fungicides can be up to 30 percent of input costs. Foliar disease resistance is therefore crucial for maintaining production and protecting the environment. A second new variety, which possesses outstanding resistance to peanut foliar diseases, is now available for use in irrigated farming systems in these regions. This new line should have a significant impact on grower profitability, as it is the first commercial variety to combine this level of foliar disease resistance with good yield potential and quality.

**Improvements in vetch versatility**

Vetch is a versatile crop adopted by growers as a pulse rotation in the low-rainfall areas of New South Wales, Victoria, Western Australia and South Australia. In some areas vetch, with its relatively high drought tolerance, provides the only reliable pulse option. Vetches can be used as grain, hay, silage, pasture and green manure. The current breeding program has made substantial progress towards the use of vetch as a multipurpose crop, not only in increasing yields in the following cereal crops but also as a valuable, high-protein feed grain for the sheep and pig industries. Including vetch grain in lamb diets has also been shown to noticeably increase lamb growth rates.

The South Australian Research and Development Institute (SARDI), in partnership with the GRDC, has developed a new, earlier maturing vetch. Rasina$^{\Phi}$ will expand grain and hay options for the low-rainfall regions of southern Australia where drought is the major problem for the later maturing variety Morava$^{\Phi}$. Rasina$^{\Phi}$ is resistant to rust and ascochyta and is a soft-seed variety with non-shattering seed pods, so harvest can be delayed with minimal grain loss.

# Molecular markers continue speeding the breeding

The application of molecular markers in plant breeding can significantly reduce the time and cost required to develop new varieties. The GRDC has supported the development of molecular marker technologies since the late 1990s. In particular, its current investment in the Australian Winter Cereals Molecular Marker Program (AWCMMP) totals $3.1 million per annum. This world-leading program is a concerted, national effort to develop and validate new molecular markers and marker technologies, and to apply them in wheat and barley breeding.

A good example of how molecular markers are used in plant breeding is a GRDC-supported barley-breeding program in Western Australia involving the AWCMMP and the Department of Agriculture and Food of Western Australia (DAFWA). One aim of the program is to develop barley that will tolerate acid soils.

Compared to other cereals, barley is particularly sensitive to soil acidity. Acidity with high levels of toxic aluminium is the largest soil constraint limiting sustainable crop production in Australia. At least 50 million hectares of surface soils and 23 million hectares of subsoils in Australia are acidic. Although effective on topsoil, surface liming does not ameliorate subsoil acidity. The combination of liming and sowing acid-tolerant crops will provide a better answer to soil acidity than soil management practices alone.

In the late 1990s researchers at DAFWA screened barley germplasm sourced from CSIRO, the New South Wales Department of Primary Industries, and international germplasm collections, including the International Maize and Wheat Improvement Center (CIMMYT) in Mexico, for useful acid soil tolerance. Once the trait had been identified, researchers at the New South Wales Department of Primary Industries mapped it and identified molecular markers closely linked to it.

Back at DAFWA, researchers validated these markers and used them successfully in their back-crossing program to produce acid-tolerant breeding lines of the malting barley varieties Baudin(ϕ) and Hamelin(ϕ). On acid soils, the new breeding lines showed at least a 20 percent yield increase compared to the standard varieties. The benefits were highest in highly acid, aluminium-toxic soils, but growers on slightly acid soils are also expected to see yield benefits. In 2005–06, the new breeding lines commenced extensive variety testing in preparation for intended release in 2009.

This will have significant implications for grain production on acid soils. Profitable barley production will soon be added to the rotation across large areas of Western Australia, and to those southern regions where the new variety will replace the old, acid-sensitive Baudin(ϕ). In Western Australia alone, the new acid-tolerant Baudin(ϕ) is expected to generate economic benefits totalling tens of millions of dollars each year for the barley industry once the new variety is rapidly and widely adopted.

*Yield comparison of acid-tolerant Baudin(ϕ) (left), an acid-tolerant breeding line (centre) and acid-sensitive Baudin(ϕ) (right) at Wongan Hill Research Station (topsoil acidity pH 5.5 and subsoil acidity pH 4.2).*

CASE STUDY

# Access to international germplasm to benefit local industry

Continued access to wheat germplasm produced by the International Maize and Wheat Improvement Center (CIMMYT) in Mexico has been very important for the development of Australian wheat varieties that have contributed to the productivity and sustainability of the Australian wheat industry. The GRDC recognises this contribution and aims to ensure that the Australian industry continues to derive maximum benefit from CIMMYT germplasm in the future. This will be achieved through GRDC support for a number of projects aimed at accessing, maintaining and enhancing the utilisation of this germplasm resource, and delivering relevant information and germplasm to Australian wheat breeders and researchers.

The projects focus on targeting, importing and evaluating CIMMYT germplasm for Australia, as well as developing tools to assist in this process. A communication project run by the Value Added Wheat Cooperative Research Centre provides breeders and other interested parties with a one-stop shop for all information relating to CIMMYT germplasm and its whereabouts. This allows assessment of information and individual targeting of CIMMYT germplasm for Australia. The communication project also provides Australian breeders with the opportunity to visit CIMMYT and get first-hand knowledge of new germplasm being evaluated in field trials in Mexico.

A second project involving the evaluation of synthetic wheat-breeding lines may also deliver benefits to the Australian grains industry. The project aims to increase the genetic diversity of wheat by exploiting natural genetic variation in wild relatives. This may overcome the narrow genetic variation present in today's cultivated wheat varieties, to make breakthroughs in relation to resistance to biotic and abiotic stresses, quality attributes and adaptation to different growing conditions.

This model for international germplasm introduction is working well for wheat in the Australian grains industry. It could set the model platform for international germplasm introduction for other species, such as barley, and will fit comfortably into the strategy that the GRDC and its research partners are developing for pre-competitive germplasm breeding.

*Doubled haploid, high harvest index wheat at a CIMMYT field station in Obregon, Mexico.*

## Output Group 1 Varieties

| Investment strategies | Achievements |
|---|---|
| Winter cereals | Ten new varieties of wheat with increased yield, disease and pest resistance, and tolerance to abiotic stresses, as well as improved quality and agronomic attributes, were made available to growers. For example, Bullaring(ф), a relatively high-yielding soft wheat with multiple rust resistances, became available to soft wheat growers in Western Australia, offering an economically competitive alternative to the rust-susceptible variety EGA 2248(ф).<br><br>In addition, six new malting barley varieties and two new feed varieties of wheat were released. One example, Flagship, was bred specifically for the large brewing and malting market in South-east Asia, China and Japan. Apart from its market advantages, Flagship has a grain yield 7% higher than the current industry standard, and improved disease resistance. |
| Canola | The canola-breeding program developed new varieties including:<br>• two conventional cultivars<br>• one triazine-tolerant cultivar<br>• two speciality high-oleic, low-linolenic (HOLL) cultivars—HOLL varieties produce oil with relatively low levels of unsaturated fats and enhanced frying stability<br>• one 'Clearfield type' cultivar<br>• *Brassica juncea* (or canola-quality mustard cultivars) in seed increase. In low-rainfall regions, these have several agronomic advantages over *Brassica napus* cultivars, including more vigorous seedling growth, quicker ground-covering ability, greater heat and drought tolerance, and enhanced resistance to the fungal disease blackleg. |
| Sorghum | The sorghum-breeding program developed germplasm with increased genetic diversity, improved grain quality and significantly improved resistance to sorghum midge, drought and disease. |
| Pulses | The pulse-breeding program released new varieties including:<br>• a new mung bean cultivar with higher yield, superior quality and improved disease resistance<br>• two types of kabuli chickpea<br>• three albus lupin cultivars<br>• three high-oleic peanut cultivars<br>• the first Australian-bred lentils. The new red lentil combines good seed quality with resistance to ascochyta blight and botrytis grey mould. It will reduce fungicide costs and risk in disease-prone areas. The new green lentil has larger seed size and improved disease resistance.<br><br>The program also took part in three AFLOMAN training workshops. AFLOMAN is a web-based decision support tool to help peanut growers assess the best time to harvest to achieve maximal returns and minimal aflatoxin contamination. |
| Commercialisation | With our research partners and co-owners, the GRDC has been actively involved in seeking plant breeder's rights and the commercialisation of new varieties. This activity includes both the selection of licensees and the negotiation of suitable agreements. Where the GRDC has invested in plant breeding through equity in a plant-breeding company, the company has been responsible for commercialising the varieties released. |

**Output Group 1 Varieties** *(continued)*

| Indicators | Performance |
|---|---|
| Crop variety testing—establishment of the National Variety Trials program in consultation with research partners and industry stakeholders | National Variety Trials were successfully established across all the major grain-growing regions of Australia. Variety data for ten winter crops (including wheat, barley and canola) from 482 GRDC-funded trials were processed. Trial results are published online at nvtonline.com.au. |
| Wheat-breeding programs—achievement of key milestones for 2005–06 | The wheat-breeding programs promoted lines, from their germplasm pipelines, that have a range of improved characteristics and provide economic benefit to growers through higher yields and/or lower risk of being adversely affected by pest, disease or abiotic stress. Where breeding programs had set goals for attaining market share with particular varieties, they successfully achieved those targets. |
| Barley breeding—establishment of a nationally coordinated program for barley breeding, with strong market links | A national barley-breeding program, Barley Breeding Australia, was established, and will commence operations in 2006–07. The program rationalises six state-based barley-breeding programs into one national program with three regional nodes. Strong links with the industry's peak body, Barley Australia, feed grain users and growers have been formed, to ensure that the breeding program has access to the right market signals. |
| Pulse improvement—establishment of a nationally coordinated program for field peas, chickpeas, lentils and faba beans, with strong market links | The National Pulse Breeding Program (NPBP) began on 1 January 2006. The NPBP brings together research partners across five states for the benefit of the Australian pulse industry. Pulse Australia is the peak body for industry consultation and market intelligence. The program is underpinned by a national market-focused plan for each pulse. |
| Importation of new wheat germplasm—coordination of arrangements for the introduction and evaluation of the International Maize and Wheat Improvement Center (CIMMYT) germplasm for Australian breeding programs | The GRDC established a suite of projects focused on identifying, importing and evaluating CIMMYT germplasm relevant to Australia. Work began to expand the program to incorporate germplasm from other international sources. |
| Genetic resources centres—establishment of a nationally coordinated project for the curation of crop and pasture plant species for Australian agriculture | Together with Australian Wool Innovation Ltd, state governments and the Australian Government, the GRDC supported the rationalisation of the five state-based genetic resource centres into the National Genetic Resources Centre. |
| Major research programs—achievement of key milestones for 2005–06 for the Australian Centre for Plant Functional Genomics (ACPFG), Value Added Wheat Cooperative Research Centre, Molecular Plant Breeding Cooperative Research Centre and the Australian Winter Cereals Molecular Marker program | The ACPFG delivered world-class science and training, and attracted international commercial collaborators. The CRC programs were integrated to ensure that research outputs were applied to developing new cereal varieties. The commercial impact of molecular marker research was realised, with all breeding programs using the technology routinely. |

# Output Group 2: Practices

## Objectives

- **To develop better farming practices and have them adopted faster**
- **To develop sustainable farming systems, adapted to each of the industry's agroecological regions, that are responsive to grower, community and catchment needs**
- **To develop and deliver cost-effective, robust and environmentally responsible solutions to current and potential crop threats**

## Overview

The Practices output group aims to develop optimal farm management practices that, when used to grow superior high-yielding varieties, will lead to increased productivity from sustainable grain production systems.

Better farming practices contribute to increased productivity by minimising yield losses caused by a broad and constantly changing spectrum of biotic and abiotic stressors, such as weeds, diseases and invertebrate pests, poor soils, and variations in climate.

The scope of the output group's activities includes developing and validating agronomic packages tailored to suit each region, to allow growers to gain the maximum advantage from the crops they grow, as well as new technologies to better manage crop threats before harvest and maintain grain quality after harvest.

Agronomic benefits continue to accrue from research on water use efficiency, improved farming systems and precision agriculture and engineering. Soil biota, subsoil constraints and nutrient uptake provide scope for improving farmer profitability, while challenges for environmentally sustainable farming practices under increasing salinity, climate variability and greenhouse emission concerns continue to evolve.

The increasing complexity of farming systems, and the need to reduce reliance on traditional chemicals to minimise the development of pest resistance, demand integrated crop protection solutions that are innovative, diverse and cost-effective.

As the genetics of both crop pests and crop hosts are better understood, the ability to manipulate pest–host interactions increases, providing farmers with vital alternatives to traditional mechanical and chemical crop protection solutions.

Another important focus is slowing the development of herbicide resistance in several important weed species. Research in this area is seeking to develop more sustainable weed management practices to delay the onset of resistance in regions and cropping systems at risk, as well as to develop alternative control strategies where herbicide resistance already exists.

The output group has a critical focus on ensuring that the latest R&D outcomes are extended to growers and other industry stakeholders. A range of on-farm participatory programs, conducted through effective partnerships and using emerging delivery technologies targeted and relevant to stakeholder needs, are under constant application and review.

Investments support education, training and other capacity-building activities that facilitate on-farm practice change and allow the grains industry to make the best use of new technology.

## Inputs

In total, $36.71 million was invested through the Practices output group in 2005–06.

In addition, the Practices output group attracted significant co-investment from its research partners. We also relied on the skills and expertise of the people within our partner organisations.

## Outputs

### Demonstrating the benefits of zone farming

Precision agriculture assists growers to vary inputs in order to reduce their own costs and to protect the environment. It includes the use of auto-steer tractors, yield monitoring, zone farming and variable rate technology.

In 2005–06, work conducted by the CSIRO Division of Sustainable Ecosystems through the GRDC-supported Precision Agriculture Initiative demonstrated that sufficient variation in yield potential can occur—in small and large paddocks, and in low-yielding and high-yielding situations—to justify zoning fertiliser inputs on economic grounds.

The economic benefits available from targeting nutrients to match yield potential in each zone, rather than fertilising large areas to match average yield potential, are influenced by a range of factors. The wider the variation in potential yield, the greater the benefit achieved. Benefits are further enhanced if there are differences in soil fertility status between zones, if the low-yielding zone dominates the paddock, or if the value of the crop decreases relative to the price of fertiliser.

Accounting for seasonal influences on yield potential is crucial in maximising the benefits of variable rate application of nutrients. As managing paddock, farm, seasonal and climate variability becomes an increasingly important element in grain farming, related information can be of considerable value to many growers.

*Auto-steer allows the accurate seeding of a new crop in the previous season's rows.* Photo: Robert Ruwoldt, Murtoa, president of the Victorian No-Till Farmers Association

### Lifting crop water use efficiency

Work by the Bureau of Rural Sciences and the Department of Agriculture and Food in Western Australia (DAFWA) has provided a framework for auditing the likely impact of management practices on yield and farm profitability. The work has examined yield trends and water use efficiency for cereals, over the past decade, in each statistical local area and agroecological zone of the Australian grain belt.

The work shows that enormous potential yield gains become available to the grains industry when constraints to achieving maximum water use efficiency are removed. The findings reported in 2005–06 provide a strategic framework for the output group to identify zones that can achieve major gains in water use efficiency and yield. The types of practices required to achieve healthy crop growth and removal of soil constraints, two key features of any effort to maximise water use efficiency, are highlighted. This will assist in developing strategies to achieve increased profitability and sustainability for the greatest number of growers collectively managing the largest area of cropping land.

During the year, the GRDC also supported training programs, delivered through the CSIRO Division of Sustainable Ecosystems, to provide growers with the tools to estimate available water and water use efficiency on their farms. This work, conducted in association with grower groups such as the Birchip Cropping Group and Mingenew-Irwin Group, is providing a range of approaches to maximise yield based on seasonal rainfall and stored moisture.

### Using new pasture legumes to improve nitrogen fixation

The availability of adapted pasture legumes is crucial to the viability of mixed enterprise (cropping–livestock) farming systems, as pasture legumes contribute 85 percent of crop nitrogen and provide significant animal production benefits. In 2005–06, four new pasture cultivars were released by the partners of the GRDC-supported National Annual Pasture Legume Improvement Program (NAPLIP).

The new releases were:

- Mintaro(ⓘ)—a subclover (*Trifolium subterraneum* subsp. *brachycalycinum*) bred by the South Australian Research and Development Institute (SARDI) and DAFWA. It is adapted to medium-rainfall areas (400 millimetres to 500 millimetres) with neutral to alkaline soils.

- SARDI Persian—the first Persian clover (*Trifolium resupinatum*) to be launched by the program, bred by SARDI. Persian clover will offer growers a pasture that is suited to heavy, waterlogged, alkaline clays. It also shows some salinity tolerance. An ability to flower early means it is the first Persian clover to provide good levels of seed-set and regeneration in medium-rainfall areas.
- Moonbi(ϕ) and Wilpena(ϕ)—the first cultivars of sulla (*Hedysarum coronarium*) to be developed in Australia. They were bred by SARDI, the Queensland Department of Primary Industries and Fisheries, and the New South Wales Department of Primary Industries. Sulla is a short-living perennial that survives for two to three years and readily regenerates from seed. Winter and spring production, especially in the second year, make sulla ideal for a short-term pasture phase that complements lucerne in a crop–pasture rotation. The cultivars are deep-rooted and aphid resistant.

**Producing healthy yields by creating healthy soils**

The Liebe Group in the northern agricultural region of Western Australia is developing and promoting integrated farm management practices to help identify and alleviate soil constraints. The group is focusing on sustainable dryland agriculture and conducting proactive research on effective management of the soil by integrating the findings from the GRDC's five-year, $10 million Soil Biology Initiative into the local farming system.

Grower members of the Liebe Group identified three main research priorities: enhancing biological and organic matter fertility, addressing soil compaction, and addressing subsoil constraints such as soil acidity.

A shallow leading tine deep ripper and modified airseeder bin were used in a one-pass operation to alleviate any physical hardpan present and to place lime throughout the profile to reduce subsurface acidity. The configuration of the ripper, which uses three tines arranged in line such that each tine rips the soil at a progressively greater depth, allows placement of soil ameliorants at three predetermined depths. The ripper and airseeder bin are also capable of injecting and mixing other soil ameliorants such as dolomite, gypsum or immobile nutrients into the soil profile.

*Liebe Group project coordinator Ben Parkin, Latham grower and Liebe Group member Peter Bryant and DAFWA researcher Chris Gazey with the shallow leading tine ripper, designed to rip soils at progressively deeper intervals, decreasing draft forces and producing better soil tilth.*

Last year's trials showed that removing soil compaction and reducing subsurface acidity by placing lime at a depth of 30 centimetres resulted in an 18 percent increase in yield .

The shallow leading tine ripper, manufactured by Agrowplow Pty Ltd to specifications developed by DAFWA, has since been combined with a modified belt spreader, and improvements to the delivery boots on the tines have ensured a more uniform placement of lime through the soil profile.

**Boosting northern farming systems by promoting chickpeas**

A new booklet, *Northern Grain Production: A farming systems approach*, developed by Pulse Australia with GRDC support, uses research results and grower testimonials to promote the benefits of chickpeas in farming systems in northern New South Wales and southern and central Queensland.

As there is no one person a grower trusts more than another grower, 13 successful chickpea growers, representing the area from New South Wales's Macquarie River Valley to central Queensland, were interviewed about their experiences with the crop. The publication also drew on collective industry expertise to integrate information on weed management in chickpeas, the crop's role in crown rot management, and the amount of soil nitrogen that growers can expect chickpeas to contribute.

Released in 2005–06, the booklet has been very popular in the GRDC's Northern Region, where chickpeas are currently the most preferred—and best adapted to the region's climate, soils and conservation farming systems—of all rotation crops.

Northern Region growers are expected to increase the area planted to chickpeas in 2006, partly because of the high levels of crown rot in cereals experienced in 2005 and the potential role of chickpeas in managing the disease.

**Managing weeds by integrating technologies**

Weeds are the most costly crop protection challenge faced by grain growers. The Cooperative Research Centre (CRC) for Australian Weed Management estimates that weed control measures and production lost to weeds cost the wheat industry alone around $700 million each year. Weed management practices are under constant pressure as farming systems evolve, as new problem weed species emerge and as herbicide resistance continues to threaten growers' traditional selection of chemical tools.

As well as providing strong support for the CRC for Australian Weed Management, during 2005–06 the GRDC invested in several ongoing regional projects, which seek to lessen reliance on single reactive chemical tools for weed control by maximising the diversity of weed management techniques and encouraging the adoption of integrated weed management.

In Western Australia, alternative weed control strategies under trial include methods of reducing the number of weed seeds that are returned to the soil each year. Techniques such as mechanical removal of weed seed heads, weed seed collection at harvest, windrow burning, and periodic deep ploughing are being explored and developed. On-farm demonstrations of successful strategies are an essential extension method for promoting adoption.

Chemical weed control methods are also under continuous review and development. New mixtures of herbicides that help to control hard-to-kill weeds and reduce the likely development of herbicide resistance are becoming increasingly important as the number of new herbicides reaching the market declines.

In Queensland, improved application equipment and methods are being developed and assessed to reduce the risk of off-target herbicide damage caused by spray drift. The challenge of this work is to maintain the efficacy of the products while reducing their tendency to move away from the site of application.

Managing annual ryegrass, Australia's most important weed in broadacre cropping, remains a key objective. New spray technologies, such as shielded sprays in wide row cropping systems, continue to be developed and demonstrated in rotational crops.

Novel technology to combat the damaging weed wild radish is being explored through a new collaborative initiative between the GRDC, the University of Melbourne and the CRC for Australian Weed Management. This project seeks to trick wild radish plants into rejecting the pollen required to fertilise seeds by making that pollen appear to come from the plants' own reproductive organs. The research is high risk but, if successful, has the potential to significantly improve our ability to combat one of the most persistent and intractable weeds of rotational cropping in Australia.

**Improving knowledge to better manage diseases of cereal crops**

In 2005–06, supported by long-term GRDC investment, the Australian Cereal Rust Control Program continued to identify new sources of rust resistance and to perform screening services for researchers and breeding companies seeking improved resistance to rust diseases. To complement this breeding approach to cereal foliar disease control, the GRDC also continued to invest in state-based pathology services that monitor disease outbreaks, identify new disease pathotypes and heightened risks, and provide growers with up-to-date recommendations for disease management.

A strong linkage with the New Zealand-based Foundation for Arable Research is allowing researchers in the Southern Region to develop better disease management practices based on more effective fungicide application and the strategic management of the crop canopy through timed fertiliser applications. Canopy management may have particular relevance to high-rainfall zones, and Australian growers have shown intense interest in the principle, which is being explored under a variety of Australian conditions.

Crown rot is another disease of wheat that can cost Australian growers dearly. It is estimated to cause production losses worth around $56 million each year. Crown rot has proved difficult to tackle using the genetic resistance approach. Management is largely achieved by crop rotation. In recent years, GRDC-funded research under the Crown Rot Initiative has demonstrated the roles of non-host crops and stubble breakdown, as well as the nitrogen and moisture status of the soil, in limiting the disease. In the most recent research, effects of precision row placement and biological and chemical seed treatments have been tested with promising results.

A predictive model for crown rot risk was also developed under this initiative, and made available to growers and advisers in 2005–06. A combination of easily measured indices, adjusted prior to sowing to account for summer rainfall, will allow growers to predict the likelihood of infection more accurately, leading to better crop rotation and management decisions.

Wheat streak mosaic virus was first conclusively identified in Australia in 2003 and has since been identified in all cereal-growing states. The disease had little impact under Australian conditions until 2005, when an outbreak in the high-rainfall zone of New South Wales damaged early-sown dual-purpose wheats over an area of at least 5,000 hectares. Many affected crops failed to produce any marketable yield. The outbreak was unexpected, and indicated more serious potential for damage than had been anticipated.

In 2004–05, the GRDC initiated a project at the University of Melbourne to better understand the epidemiology of wheat streak mosaic virus and its vector, the leaf curl mite. As a result of this work, a large preserved collection of leaf curl mites has been accumulated, and the taxonomy, distribution and host range of this vector in Australia is becoming clearer.

After the 2005 outbreak, this project was allocated additional resources to accommodate the increased sampling, analysis and field research program that the outbreak precipitated. Further work in 2006–07 is expected to begin to unravel the many questions that remain about the causes and potential for re-occurrence of the 2005 epidemic, and what measures may need to be taken to reduce the future spread and impact of this disease.

*Wheat streak mosaic virus can have a major impact on yield.*

**Improving knowledge to better manage diseases of rotational crops**

Pulses and oilseeds, as rotational crops, play a critical role in maintaining the viability of cereal cropping systems as well as contributing to overall farm production. Fungal and viral diseases can seriously limit production in rotational crops, as they can in cereals. In 2005–06, the GRDC continued to invest in regionally based pathology support programs for pulses and oilseeds that augment breeding programs and assist farmers to respond effectively to disease outbreaks.

Management of blackleg in canola depends on varietal selection, avoidance of close rotations and strategic use of fertiliser-applied fungicides or seed dressings. The GRDC invests in several research projects that are improving growers' blackleg management through better understanding of the variability of the pathogen and its capacity to counter the genetic resistance mechanisms of plants. In 2005–06, work on the disease management effects of burning canola stubble showed that fire has little effect on the carryover of infection from one season to the next. Growers are now advised against this management practice, because the risks of wind erosion of soil resulting from burning outweigh any advantages they may derive from lowering disease inoculum.

A second but increasingly prevalent disease of canola is sclerotinia. Fungicide trials conducted in New South Wales are demonstrating the efficacy of a range of treatments. Equally importantly, models developed from field data are beginning to explain the epidemiology of this highly unpredictable disease. The New South Wales Department of Primary Industries is conducting a project that aims to develop better forecasting methods for disease severity, along with integrated control strategies.

Ascochyta blight is a widespread and damaging disease of chickpeas and other pulses. In Western Australia, fungicide trials in low, medium and high rainfall zones have further refined management packages that were previously recommended for desi chickpeas with moderate disease resistance.

In addition, an updated version of the Chickpea Disease Management Strategy for Southern Australia was released in November 2005, to reflect the results of further work by the Victorian Department of Primary Industries pathology team based in Horsham.

*Blackleg infection in canola crops can be reduced by sowing different canola varieties possessing different blackleg resistance mechanisms in rotation.*

**Strengthening guidelines to protect Australia from new pest incursions**

With support from the GRDC and the Grains Council of Australia (GCA), the National Grains Biosecurity Plan was launched by Plant Health Australia in August 2005. The GRDC invests in the activities of this national coordinating body for plant health to protect Australia's export markets, to ensure that pest threats to Australian graingrowers are identified and quantified, and to ensure that contingency plans will be in place in the event of an incursion.

Through strong collaborations with other GRDC research partners, Plant Health Australia has developed guidelines for pest-specific contingency plans that address the issues of diagnostics, impact, allied industries and ecosystems, selection of control treatments, surveys, risk mitigation protocols, eradication, and stand-down when an eradication attempt has failed. With these tools (and with one plan in place) the project is now aiming to prepare 15 priority emergency plant pest contingency plans over the next three years. Preparation of the first five plans are well underway.

In addition, the project is developing a national surveillance plan for the Australian grains industry. Surveillance capability and protocols are vital not only for early detection of new pest incursions, but also to demonstrate to Australia's export markets the integrity of the grains industry as a reliable supplier of pest-free produce.

# Integrated weed management workshop puts growers in control

In 2005–06, 211 farm advisers were trained in integrated weed management (IWM) through a collaborative project involving the GRDC, the CRC for Australian Weed Management and Sydney-based consultancy ICAN Pty Ltd. The objectives were to encourage more rapid farmer adoption of improved weed management practices, and to slow the development of herbicide resistance and the resultant loss of valuable herbicides by providing advisers with better knowledge and skills in IWM.

Feedback from advisers was extremely positive. Approximately two-thirds of workshop participants gave the two-day course top marks for overall value and for the quality of instruction received.

The course is mapped to national competency standards. Participants electing to be assessed receive credit for two units at Level 5 (diploma level) from Yanco Agricultural College. As an added bonus, and as a clear sign of industry acceptance of the course, the competency can also be used to re-accredit with AgSafe.

The GRDC played a pivotal role in supporting the proposal to develop the training package. In an excellent example of cross-industry collaboration, the CRC for Australian Weed Management supports the project by providing 'key speaker firepower' to keep the course at the cutting edge. Crop protection company Bayer Crop Science recognises the benefits of IWM and has sponsored several IWM workshops.

The course is comprehensive. To impart so much information effectively in only two days, a high-quality technical resource is needed to support the training. The Weeds CRC has developed a world-class, 350-page manual, which sets a new standard as a detailed and innovative weed management reference. The manual is available as PDF files downloadable from the CRC's website, www.weeds.crc.org.au, and will be published in hard copy in 2006–07.

Further workshops will be offered in 2006 and 2007.

*In 2005–06, 211 advisers participated in the two-day integrated weed management workshops developed in collaboration with the CRC for Australian Weed Management.*

CASE STUDY

# Oilseed industry development officer responds to growers' needs

In 2005–06, the GRDC and the Australian Oilseeds Federation (AOF) invested in the establishment of an oilseed industry development officer position for Victoria and southern New South Wales. The position will allow for the delivery of agronomic extension that will enhance farm and crop management best practice, particularly in relation to disease management, pest management and yield improvement, ultimately assisting in the expansion of oilseed crops.

The need for an industry development officer arose, in part, out of concern held by the GRDC and the AOF that growers needed more confidence in growing canola. A run of late breaks and recent low prices have led to a reduction in the area sown to canola. However, canola still has an important place in crop rotation, and the GRDC believes that most growers through more careful management of their inputs, particularly fungicides and fertiliser, can achieve more profitable returns at lower risk. The AOF also wants to remove the perception that canola is a risky crop to grow.

Felicity Pritchard is now working with graingrowers, grower groups, advisers, oilseed marketers and researchers to assist in the flow of information and feedback between the various groups within the industry, with the ultimate aim of boosting the production of dryland and irrigated oilseeds in Victoria and southern New South Wales.

Felicity's role is likely to also extend to developing agronomic packages for other oilseeds, such as canola-quality mustards and, possibly, biodiesel crops.

*Felicity Pritchard, new industry development officer, works with grower groups in Victoria and southern New South Wales to help expand oilseed production.*

# Model farming systems save topsoil

The GRDC has been a major investor in research to understand and quantify the environmental impacts of sustainable cropping systems. The GRDC-supported project to improve water quality in grain-farming catchments is just one example. It aims to extend best management practices within grain farm catchments as a basis for improved water quality and protection of aquatic environments.

In 2005–06, Queensland Department of Primary Industries and Fisheries soils scientist and project leader Dan Rattray, together with fellow researchers David Freebairn and Norm Gurner, used a computer model to assess the impact of land use on water quality in the Felton Valley, south of Toowoomba. The model was developed to design practices that improve water quality at both the farm level and the catchment level.

Felton Valley farmers, through their Landcare group, had developed an action plan for reducing erosion in their valley and were looking to prioritise the necessary remedial activities before asking for financial help from government. Some 60 percent of the Felton Valley's 17,000 hectares is cropped, and spatial analysis by Dr Rattray's team identified about 400 hectares which were 'steep'—that is, they had more than 5 percent slope.

The computer model was linked to geographic information systems (GIS) software that allowed the catchment group and the scientists to visualise where the erosion 'hot spots' were and to assess the likely impact of managing these at the local and catchment levels. The computer model showed that when steeper country had less than 5 percent stubble cover, and was subject to traditional cultivation, erosion losses could be as much as 30 tonnes to 40 tonnes of soil per hectare. But it also showed that, if all cropping in the valley was carried out under minimum tillage methods, total erosion would fall to 5,000 tonnes and sediment loss at the end of the valley to 650 tonnes.

The farmers—and government—must have been impressed, because already 80 hectares of the 'steep' cultivation area have been converted to permanent pasture, three farmers are converting their machinery to reduce tillage, and $50,000 has been allocated by the Natural Heritage Trust for soil conservation structure repairs. Dr Rattray and his fellow scientists have proved the worth of their computer model in defining the natural resource management benefits of conservation tillage practices.

*Dan Rattray collecting a runoff sample from a 'nested' catchment study exploring impacts of management on water quality from grain farms. Such data helps to build an understanding of catchment processes, leading to improved strategies to minimise off-site impacts of agriculture.*

## Output Group 2 **Practices**

| Investment strategies | Achievements |
|---|---|
| New technology | Through GRDC-supported projects:<br>• precision agriculture and zone cropping methods were developed and communicated to growers<br>• findings of the Soil Biology Initiative were communicated through better soil management packages<br>• priority areas were identified, to assist in bringing grain yields closer to the potential water-limited yield across agroecological zones and statistical local areas<br>• economic options for the removal of subsoil constraints were identified<br>• the drivers of climate variability were more clearly identified through the Managing Climate Variability Program. |
| Agronomy | Achievements in relation to agronomy included:<br>• management packages for pulses and oilseeds, developed and communicated to growers<br>• tools for the measurement of crop water use were communicated to growers<br>• strategies to achieve high cereal yields in rotation with cotton were developed<br>• approaches to better integrate livestock into cropping systems, developed through the Grain and Graze Program. |
| Integrated control methods | Western Australian researchers continued to develop integrated control strategies for wild radish that improve crop yields, have effects on other weeds and reduce the tendency for wild radish to become herbicide resistant. Results to date show that well timed 'crop-topping' herbicide applications can reduce wild radish seed set and are simultaneously effective for wild radish and annual ryegrass in short-season lupin crops. Weed head trimming using a standard header can further reduce wild radish seed set and is an example of the novel practices being developed for future integration into increasingly complex farming practices. |
| Biosecurity | As a result of the GRDC's support for Plant Health Australia, protocols were set in place for the preparation of contingency plans for the highest priority emergency plant pests considered most likely to gain entry to Australia and affect the grains industry. Fifteen such plans are to be completed in the next three years.<br>With the support of Plant Health Australia, the CRC for National Plant Biosecurity and the GRDC, the New South Wales Department of Primary Industries developed a new, highly accurate molecular test for Karnal bunt. Misidentification of this disease in Pakistan threatened Australian exports in 2004, and the new test was developed to prevent such an emergency from re-occurring. The test will reduce the time taken to accurately identify the disease from two weeks to less than one day. |

**Output Group 2 Practices** *(continued)*

| Investment strategies | Achievements |
|---|---|
| Commercialisation | With support from the GRDC, the CRC for Australian Weed Management has developed a novel seeding machine for conservation farmers. The StubbleStar® cuts through heavy stubble burdens more reliably, and disturbs less soil, than conventional tined seeding equipment. The seeder gives farmers greater capacity to adopt minimum tillage under difficult stubble-handling conditions, and is the subject of two patents, with more pending. Specialists in technology commercialisation were appointed to the project, and a suitable manufacturing company is being sought to enter into a licensing agreement to manufacture and distribute the StubbleStar®.<br><br>Two candidate antifungal genes and a caterpillar control gene discovered in the GRDC–CSIRO venture Grain Protection Genes are the subject of patents and have progressed through plant proof-of-concept stage. All three genes show sufficient promise to warrant transfer for testing in appropriate crop models. A herbicide resistance gene candidate was also isolated and a provisional patent application was filed. |

| Indicators | Performance |
|---|---|
| Implementation of a stratified survey to measure current on-farm practices such as the use of gypsum and lime for soil amelioration, controlled traffic, precision agriculture, variable rate technology, nutrient budgeting, risk management tools, the monitoring of water use and deep drainage, and the sowing of perennial pasture species | The 2005–06 tracking survey found that the late arrival of last year's opening rains had a big impact on preseason management practices among graingrowers:<br>• use of gypsum rose 1% to 49%<br>• use of lime fell 2% to 39%<br>• use of controlled traffic fell 4% to 20%<br>• use of variable rate technology rose 4% to 20%<br>• use of other forms of precision agriculture rose 7% to 29%<br>• use of nutrient budgeting fell 9% to 54%<br>• use of risk management tools fell 1% to 27%<br>• monitoring of plant available water content was 32%<br>• monitoring of depth to the water table fell 4% to 24%. |
| Faster adoption of new practices, including targeted sustainable on-farm practices and technologies, by graingrowers | In 2005–06, 89% of growers surveyed were undertaking activities or initiatives to ensure the long-term sustainability of their farms. Recognition of the role of the GRDC in influencing the adoption of these actions increased, from 48% to 53% of survey respondents. |
| Increased number of farmers involved in grower groups | The 2005–06 tracking survey found that 43% of growers, up from 42% in 2004–05, were members of formal or regular farm discussion groups. The proportion was highest in Victoria, where 59% of growers were members.<br><br>In addition, the number of surveyed growers who stated that what they heard through grower groups was the major influence in motivating on-farm change increased from 46% to 64% during the year. Grower groups remain the most influential source of information. |

**Output Group 2 Practices** *(continued)*

| Indicators | Performance |
|---|---|
| Enhanced management options for cereal foliar and root diseases across agroecological zones | The GRDC-sponsored publication *Cereal Growth Stages: The link to crop management* details important new information on the timing of cereal foliar fungicide spraying, the role of fungicides alongside other disease management strategies, and the potential for using canopy management in high-rainfall zones to minimise the effects of leaf disease epidemics.<br><br>The latest GRDC annual survey results indicated that the number of growers who feel better equipped to deal with disease management issues has risen by 4% to 82% of growers surveyed. |
| Increased farmer awareness and adoption of weed management practices that delay the development of herbicide resistance | Some 94% of growers surveyed claimed to recognise the importance of the GRDC having an investment role in delaying and managing herbicide resistance. Farmers have become more proactive in their preventative strategies, with those taking positive action to delay the onset of herbicide resistance increasing by 3% to 88%. |
| Identification of new approaches to crop protection, including the use of genetic manipulation of weeds, pathogens, invertebrate pests or crop hosts | Increasing knowledge and understanding of plant and pest genetics are expanding growers' options for crop protection. Recent analyses at the University of Adelaide have demonstrated significant genetic differences between wheat lines in their ability to compete with weeds. For example, commercial cultivars such as Janz and Wyalkatchem are particularly sensitive to weed competition. This project is working toward providing farmers with a new weed management tool: the competitive ability of the crop itself. A major achievement in 2005–06 was developing the ability to assess crop tolerance to weeds in single-row plots. This will allow effective assessment of weed competitive ability even when seed is limited. |

# Output Group 3: New Products

## Objective

- **To develop innovative technologies, management practices and grain products that enhance grower profitability and the competitive performance of Australia's grain value chains**

## Overview

The New Products output group invests in research, development and commercialisation opportunities in grain and farm products for the Australian grains industry at all stages of the value chain.

The scope of the output group's activities includes:

- developing and delivering new products and services to growers
- accessing and applying intellectual property to help speed the delivery of new technology to the Australian grains industry
- identifying suitable structures and partnerships to attract third-party investment
- developing robust business cases that demonstrate market demand and value to support any product or service that the GRDC and its research partners propose to invest in researching, developing or commercialising.

These activities aim to improve the development and application of novel on-farm technologies, new and sustainable grain storage strategies and radical new biocontrol agents. The output group also seeks to improve industry food safety management and identify investment opportunities in new grain products that have the potential to enhance grower profitability.

The output group recognises that in many of these areas there are few potential research and commercialisation partners within Australia, and this makes it necessary to identify opportunities to form partnerships internationally to help new technologies reach Australia sooner.

## Inputs

In total, $11.18 million was invested through the New Products output group in 2005–06.

In addition, the New Products output group attracted significant co-investment from its research partners. We also relied on the skills and expertise of the people within our partner organisations.

## Outputs

**Gathering new product market intelligence**

Prior to the commitment of a large investment, prudently directed scoping studies are used to gather market intelligence. Areas currently being examined include biofuels, speciality grain food products, novel oils with altered oil profile for better health, on-farm instrumentation, and opportunities for Australian grains in Asian markets.

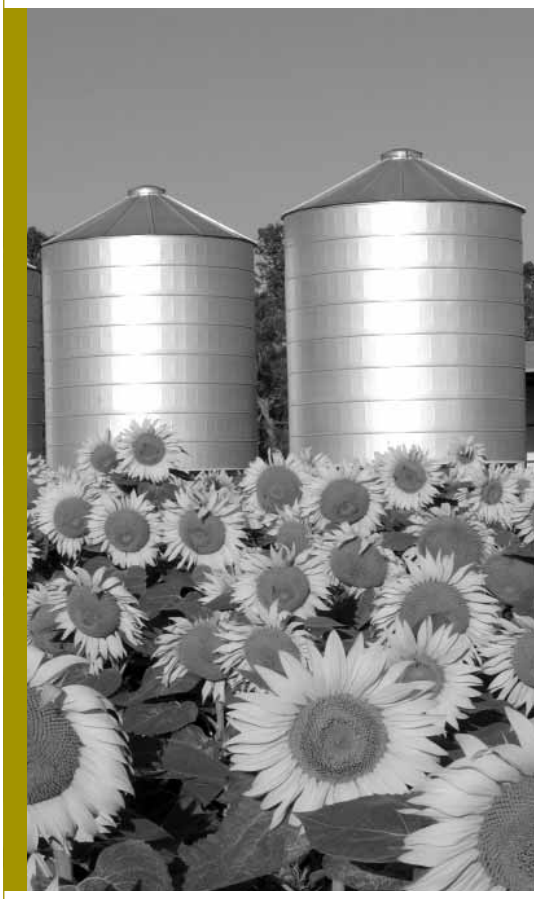
One such study of the Chinese wheat market, carried out in conjunction with AWB Ltd, showed that the Australian wheat industry cannot rely just on growth to drive a relationship, and must consider other factors such as ways to capture premiums for grain quality in the Chinese market. The reason for this is that, as China's demand is shifting towards higher quality grain, China's capacity to produce such grain is also increasing. This result reinforces and adds direction to the GRDC's commitment to determining the correct traits to concentrate on in the Varieties line of business.

Another scoping study was commissioned on the possibilities for biomass ethanol in Australia. This study examined the likely technologies, time frames, capital costs and production costs, and included a preliminary assessment of potential biomass availability. A watching brief was recommended: to allow United States technologies to mature and absorb the high risk associated with start-up technologies, with a view to adapting

suitable projects for use in Australia in the future; and to monitor oil price trends, which forms the basis of assessing the viability of the ethanol industry.

**Developing sustainable grain storage technologies**

The development of sustainable grain storage technologies continues to be a key investment area for the GRDC. Ongoing research to improve our understanding of the mechanisms behind insect resistance to phosphine aims to maintain phosphine's effective use as a stored-grain fumigant. In 2005–06, good progress was made in understanding how phosphine gas disperses through the grain silo and how effectively this kills the insects at various levels. Also, the use of phosphine in unsealed silos was examined and shown to be ineffective. This is an extremely important result, as ineffective use contributes to increased pest resistance.



*Resistance in grain insect pests to the fumigant phosphine could cost the grains industry between $200 million and $300 million annually.*

The GRDC has invested in resistance monitoring and management activities on a national basis to ensure that resistant insects are identified quickly and eliminated. Meanwhile, research to develop new fumigants continues in case insect resistance eventually causes phosphine to be lost to the industry altogether. This year a promising new fumigant, called Spinosad, was identified, and the process of gaining approval for use in Australia commenced. This is an enormous achievement considering how difficult it is to find appropriate fumigants to use in grain storage to kill the insects and leave a minimal residue. Additionally, a significant success was achieved by one of our projects to secure the use of several other important fumigants (including dichlorovos, fenitrothion and methoprene) for use in the Australian grains industry.

Harvest bags are a novel storage technology that the GRDC has invested in, to better understand the value of the technology and its potential to deliver greater flexibility to an integrated grain harvest storage system. In 2005–06, the first year of inspection trials, a number of key issues such as the level of gas tightness and punctures were identified for closer monitoring.

**Managing food safety risks**

Although food safety risks are generally low in the grains industry, it is important for the industry to have the ability to manage food safety risk in order to guarantee market access and the broader safety of consumers. The GRDC supports the Australian Food Safety Centre of Excellence and has invested in a number of other projects which examine specific problems.

For example, a project at the Queensland Department of Primary Industries and Fisheries has been employed to produce a management plan for mycotoxin contamination in maize. The researchers have successfully assessed the risks for mycotoxin contamination from the current crop and set out an action plan to mitigate the risks. They collected samples of grain and assayed for mycotoxin contamination. This strategy has confirmed a low risk of contamination in maize for the toxin this year.

The GRDC has also invested in the further development and extension of biocontrol options for the organisms that cause annual ryegrass toxicity. These projects will provide both useful tools for growers and vital strategic information for the grains industry.

**Investigating new uses for grains**

New Products has the challenge of examining and developing a variety of new grain products to ensure that Australian graingrowers have access to new and developing markets. Importantly, the GRDC is working with all areas of the value chain to ensure that identified new products can successfully be commercialised successfully.

Projects in progress during 2005–06 included research to develop niche food products, such as new food uses for feed grains. Lupin is a relatively unresearched crop in terms of the products it can provide for human and animal consumption.

GRDC projects have shown that lupins can have very positive health benefits and that a number of novel food additives can be extracted from the grain. The CRC for Innovative Grain Food Products is researching the feasibility of creating new food products, not only from feed grains but also from variants of other grain varieties, to create new markets for graingrowers. These results will assist grain producers to select crops that can be used in supplying health foods or additives to the food-manufacturing sector and, potentially, to receive premiums for these grains.

CASE STUDY

## Go Grains spreads the good word

Go Grains is an independent, membership-based organisation that delivers messages about grain nutrition and health to consumers.

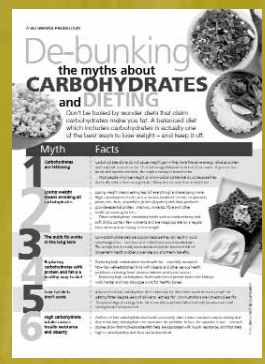
Go Grains began as a joint initiative of the GRDC and BRI Australia in 1998, and became an independent organisation in 2005. Its members are companies and organisations with an interest in maintaining a high profile for grain and pulse foods in order to promote consumption and ensure that consumer demand for grain-based foods remains strong.

The work undertaken by Go Grains underpins market demand for grain-based products and helps to offset the impact that the long-term decline in the terms of trade—caused by steadily falling grain prices and rising production costs—has on the Australian grains industry. The GRDC's support for Go Grains aims to ensure that the industry benefits from continuing strong market demand for grain.

Go Grains seeks to understand consumer requirements for nutritious, high-quality foods, to be aware of lifestyle trends that affect food consumption, and to translate the benefits of grains into meaningful messages. Appropriate responses to market requirements will ensure that the Australian grains industry continues to produce safe, healthy food products that are trusted and valued by consumers.

Through a range of well-placed media releases, information packages and education initiatives, the organisation has become a recognised reference point for positive and factual information. Through the persistent and careful cultivation of this image, Go Grains will remain a powerful marketing vehicle for the grains industry.




*Go Grains, through the production and wide distribution of brochures, ensures that high-quality factual information reaches health professionals and consumers.*

CASE STUDY

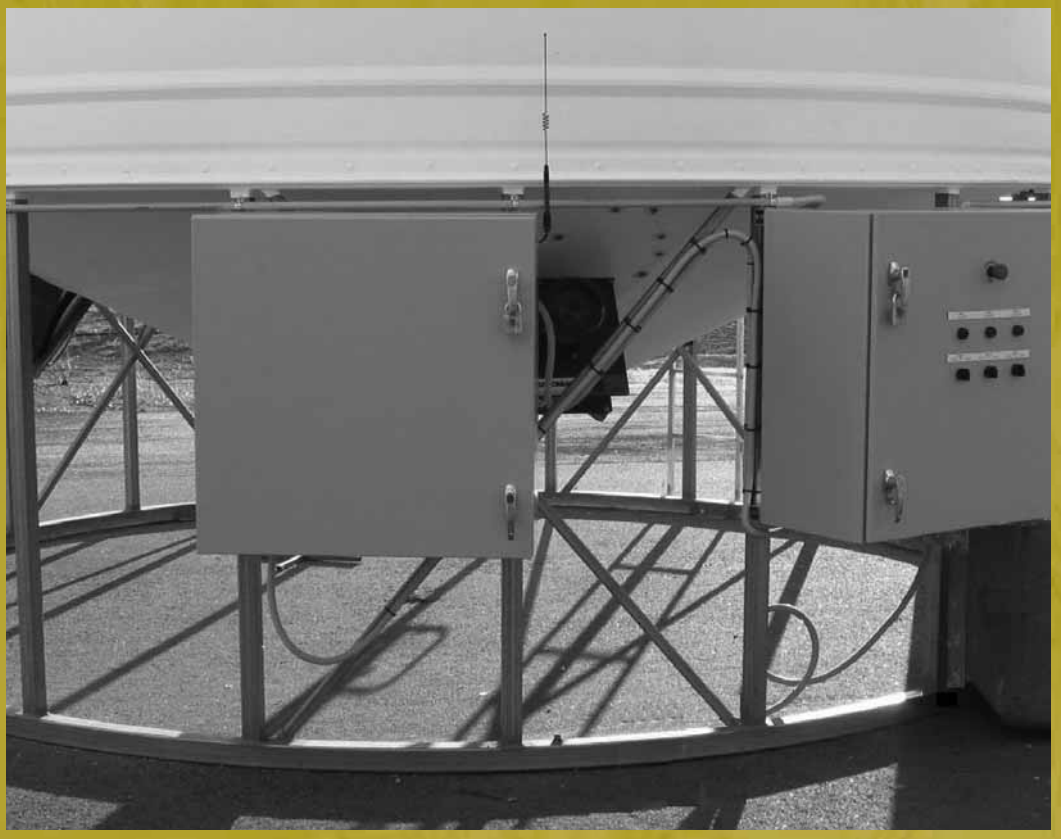
# Aeration controllers streamline storage management

Achieving and maintaining consistent grain quality in storage depend on a number of environmental factors, and the management of storage systems can be a complex and expensive exercise. The GRDC partnered the CSIRO Stored Grain Research Laboratory in Canberra and a Western Australian company, Industrial Automation, to develop an aeration controller that simultaneously controls the aeration, drying, cooling and maintenance functions for up to ten independent storage units.

The new Adaptive Discounting Controller took seven years to develop, and became available to growers as the 'Aeration Manager' in 2005–06. Uniquely, the system takes into account both the moisture content and temperature of grain at the time of loading and the desired grain condition after time in storage, and controls aeration to achieve this result.

The controller turns fans on only when the grain requires airflow, resulting in significant efficiencies in operation. The adaptive discounting feature uses technology that recognises when weather conditions may cool or dry grain more than normal, and adjusts certain set points to take advantage of the conditions. Failsafe alarms increase the reliability of the system and offer additional peace of mind for the farmer.

This successful partnership between public-sector and private-sector organisations, based in different states, to research, develop and commercialise this technology is an example of the GRDC's role in identifying industry needs and facilitating a beneficial outcome for graingrowers.



*The new Adaptive Discounting Controller can control three aeration functions at once: cooling, drying and maintenance.*

**Output Group 3 New Products**

| Investment strategies | Achievements |
|---|---|
| New uses | The GRDC invested in projects that have:<br>• examined the commercial opportunities in the developing biofuels industry in Australia and North America<br>• collaborated with animal industries to improve the use and value of feed grains by creating calibrations to determine the digestible energy in grain.<br>The GRDC also:<br>• supported the CRC for Innovative Grain Food Products to conduct research projects on Bioprocessing, Healthy Foods and Fibre, and Fodder to Food<br>• agreed to enter into an incorporated joint venture with CSIRO and Groupe Limagrain of France to complete the development and commercialisation of high-amylose wheat<br>• identified the most suitable oilseed crops to be used as a platform for the development of industrial oils from the CSIRO–GRDC Crop Biofactories Initiative<br>• examined the economic benefits for the development of novel oilseeds with altered oil profiles for use in the human food and animal feed markets. |
| Storage | The GRDC worked with research partners and supply chain participants to coordinate the development of a national approach to grain storage research and extension in order to continue to:<br>• nationally monitor and manage chemical resistance in stored-grain pests<br>• seek commercial partners to continue the development and registration of new chemicals to assist in the management of stored-grain pests<br>• develop non-chemical alternatives to existing chemical strategies for the management of stored-grain pests, including through projects on alternative fumigants and heat disinfestations<br>• extend and improve the use of drying and cooling to protect stored grain<br>• overcome moisture problems<br>• assist growers to make economic on-farm grain storage decisions<br>• validate resistance gene-specific and quantitative markers of phosphine resistance in stored-grain pests. |
| Quality testing | The GRDC supported research to:<br>• develop objective grain quality testing technologies, such as an on-farm, near-infrared spectroscopy moisture meter<br>• manage the quality of barley in storage<br>• develop leading-edge technologies to assess grain quality at receival.<br>The GRDC also supported:<br>• a risk assessment and further work to develop strategies for the management of mycotoxins in maize<br>• the establishment of the 'no observable effect' levels of common toxins found in grain<br>• the development of biocontrol options for annual ryegrass toxicity causal organisms.<br>The GRDC commissioned a technology and market assessment study to identify investment opportunities and potential partners to develop technologies to assist growers to analyse soil and grain properties on-farm. This is a precursor to the development of a more detailed investment strategy. |

**Output Group 3 New Products** *(continued)*

| Investment strategies | Achievements |
|---|---|
| Commercialisation | In April 2006, a jointly owned company, Philom Bios (Australia) Pty Ltd, was established to commercialise a range of new soil inoculants. |

| Indicators | Performance |
|---|---|
| Commencement of a situational analysis of on-farm grain storage, taking into account the needs of growers, identifying storage options and the impacts that they could have on other value chain participants | Expanding on work done in 2004–05, the GRDC worked with other value chain participants and researchers to investigate the management and use of phosphine. The objective is to develop a whole-of-chain investment and management vehicle to optimise the industry's investment in stored grains into the future. |
| Collaboration with three or more value chain participants, ensuring that Australian grain participates more effectively in Asian markets | During the year the GRDC put in place a research project to test Australian grain in a new higher value Asian market not usually supplied by Australia. In supporting this project together the researcher involved several marketing chain participants. |
| Commercial evaluation and testing of biological inputs for profitable farming, enabling final commercialisation arrangements to be established | Under the unincorporated joint venture between the GRDC and Philom Bios Inc. of Canada, established in early 2005, limited field trials were carried out during the 2005 season and a business case for the establishment of an incorporated joint venture was completed. |
| Development of a business case for the commercialisation of a suite of new grain fumigants, and the commercialisation of these fumigants through to the negotiation of suitable licensing arrangements | A licence option agreement was developed between CSIRO (on behalf of the GRDC and the other co-owners of the technology) and BOC Ltd to undertake the evaluation and registration of carbonyl sulphide and ethyl formate. |

# Output Group 4: Communication and Customer Services

## Objectives

- **To deliver targeted and integrated information on research outputs arising from the GRDC's total R&D investment to all stakeholders**
- **To facilitate effective communication of the GRDC's R&D outcomes to all its identified customer segments**
- **To build critical mass in research capacity in collaboration with the GRDC's research partners that is able to maintain high-quality research standards and deliver against current and future needs of the Australian grains industry**
- **To identify the best means to attract and retain talented students and researchers in agricultural disciplines—such as breeding, agronomy and entomology—which benefit the grains industry**

## Overview

The Communication and Customer Services output group is responsible for communication, including the packaging and delivery of information, across the GRDC's total investment portfolio.

This is achieved by building strong alliances not only with the GRDC's key customer groups—the Australian Government and Australian graingrowers—but also with agribusiness, state agencies, the research community and other key stakeholders. Engaging with key information conduits, particularly public and private sector advisers, also helps the GRDC to tailor and deliver information in ways that recognise the diverse needs of the grains industry.

The output group is also responsible for managing the GRDC's capacity-building investment program that aims to facilitate learning and continuous improvement within the grains industry to achieve profitability and sustainability. The GRDC recognises the importance of supporting, and facilitating access to, the latest in national and international research initiatives, as well as the benefits of establishing industry networks. This is achieved by supporting conferences, scholarships, training and development awards.

## Inputs

In total, $8.93 million was invested through the Communication and Customer Services output group in 2005–06.

In addition, the Communication and Customer Services output group attracted significant co-investment from its research partners. We also relied on the skills and expertise of the people within our partner organisations.

## Outputs

### Supporting industry skills development

Business, research and industry skills improvement and development are core components in the GRDC's capacity-building program. Each year the GRDC financially supports individuals associated with its partners (grower groups, government agencies, research organisations and the broader industry) to further develop their skills by undertaking grains industry-related travel, participating in study tours, attending conferences, or undertaking training at a recognised institution or organisation.

In 2005–06, $158,344 was allocated to 50 grains industry groups or individuals to fund travel to conferences or meetings, either overseas or in Australia. For example:

- In September 2005, Mike Sisson, a senior research scientist with the New South Wales Department of Primary Industries, travelled to the United States to attend the American Association of Cereal Chemists International Meeting.
- In November–December 2005, Robyn McLean, a senior plant breeder with the Department of Agriculture and Food Western Australia, travelled to Argentina to attend the Seventh International Wheat Conference and visit wheat-breeding programs.
- In February 2006, Thomas Wolf, a research scientist from the Saskatoon Research Centre in Canada, came to Australia to give presentations at the GRDC's Victorian and New South Wales farmer updates.

The GRDC also offers Industry Development Awards that allow graingrowers to undertake study tours within Australia and overseas. In 2005–06, the GRDC allocated more than $153,000 to cover the costs of 13 study tours. For example, a group from Western Australia's South East Premium Wheat Growers Association looked beyond the farm gate to develop the local grains industry during their study tour in August 2005. During the six-day tour, the group interacted with grain handlers in Fremantle, and visited the Bureau of Meteorology, the University of Western Australia's Field Research Station and the State Agricultural Biotechnology Centre.

In 2005–06, the GRDC allocated $293,400 to support 28 conferences, seminars, field days and workshops. The events included:

- Agriculture Australia 2005, held in Melbourne, Victoria
- the Facilitating Adoption of No-tillage and Conservation Farming Practices Conference, held in Tamworth, New South Wales
- the Fifth Australian Sorghum Conference, held on the Gold Coast, Queensland
- the Thirteenth Australasian Plant Breeding Conference, held in Christchurch, New Zealand
- the Fiftieth Annual Conference of the Australian Agricultural and Resource Economics Society, held in Sydney, New South Wales.

The GRDC also provided $1,524,576 to students and researchers undertaking training at recognised institutions or organisations during the year. Financial support was provided for four visiting fellowships, ten research scholarships, 15 undergraduate honours scholarships and five agricultural training awards.

**Expanding industry research capacity**

In 2005, the GRDC spent $1.4 million on maintaining and building capacity in disciplines that will underpin current and future strategic research needs in the Australian grains industry. The principal investment areas included:

- undergraduate scholarships
- PhD scholarships
- post-doctoral fellowships
- conference sponsorship
- travel awards.

The GRDC invests in scholarships in strategic areas such as molecular biology, cereal chemistry, cytology, pathology, physiology, quantitative genetics, agronomy and crop modelling. An internal audit of grains industry research scholarships (PhDs) showed that the GRDC invested just over $1 million in 2005–06. Of the 66 GRDC scholarships:

- 60 percent were associated with the Varieties output group
- 26 percent were associated with the Practices output group
- 14 percent were associated with the New Products and Communication and Customer Services output groups collectively.

Having a clear understanding of where the GRDC allocates funds for research scholarships was a key step in setting the foundations for a targeted approach to mapping the skills, capabilities and research capacity presently available in the grains industry.

In 2005–06, discussions were held with a broad range of R&D bodies, including universities, state departments, CRCs and research organisations, to identify and track research capacity investment. The participants recognised that:

- there is a large number of diverse organisations involved in building scientific skills and knowledge across the grains industry

- organisations have overlapping yet distinct roles in building research capacity
- a coordinated approach is required to gain collaboration and cooperation to undertake a comprehensive research capacity audit.

As a result of the discussions, the GRDC concluded that the 'building research capacity' component of the output group's investment needed further analysis. The proposed audit, audit report and a detailed capacity-building strategy were not progressed in 2005–06.

The GRDC will now develop a research capacity plan through a number of staged projects:

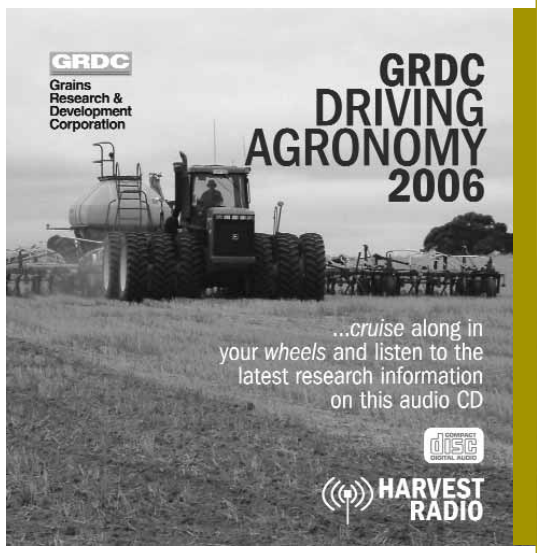
- stage 1—conducting an audit of existing research capacity in the Western Region, including current capacity at universities and state departments, as a precursor to a national audit
- stage 2—validating and analysing the findings of the audit, in conjunction with key research partners.

**Delivering research information through the airwaves**

For the second consecutive season, *Harvest Radio* delivered information and case studies on topical grains industry issues. Researchers directly involved in addressing many of these challenges outlined the latest findings and strategies for graingrowers to manage and improve farm productivity.

Key topics in 2005–06 included:

- forecasting climate and minimising the risks associated with climate variability during the cropping season
- managing the incidence of crown rot, a fungal disease that was widespread across the eastern grains belt in 2005
- achieving yields of 20 tonnes per hectare in the irrigated zones of southern New South Wales
- addressing grain storage threats, including the ongoing problems associated with phosphine resistance, and developing other methods to enhance graingrower productivity
- minimising the risk of frost damage, with reference to a frost fact sheet released by the GRDC in March 2006.




*A compilation of selected audio programs featured on* Harvest Radio *are packaged up and presented on* Driving Agronomy*, an audio CD which is distributed to all growers annually.*

The programs are hosted on the GRDC's website, Grain*Zone*, and can be accessed through www.grdc.com.au/radio/main.htm.

The GRDC also released *Driving Agronomy*, an audio CD outlining many of the agronomic topics covered by *Harvest Radio*. Growers and advisers can listen to the latest issues affecting the industry in a format that can readily be used in vehicle, machinery and home audio devices.

**Nipping frost damage in the bud**

GRDC-supported research over the past four years has identified some effective strategies to reduce the risk of crop damage and losses due to frost. However, some parts of south-eastern Australia and, particularly, Western Australia experienced major yield losses in 2005 due to a 'once in 20 years' frost event. Economic losses caused by frost damage were estimated to be approximately $310 million across the country.

A GRDC advice sheet was subsequently distributed to 36,200 growers, across Australia, to assist them to minimise frost damage in the future. The advice sheet outlined some important management strategies that growers can implement to reduce frost damage. Key factors to consider include crop type and variety, sowing time, soil type and condition, atmospheric and soil moisture levels, crop nutrition and crop stress levels.

FARMER ADVICE

GRDC
Grains Research & Development Corporation

HARVEST RADIO: Listen to an online audio presentation on frosts by going to www.grdc.com.au/radio/main.htm and scrolling to the relevant link

MANAGING FROST
MINIMISING DAMAGE

The risk of losses due to frost damage is increasing throughout Australia's cereal-growing areas because growers are sowing more crops with higher inputs and greater yield potential. This means the yield and financial losses from frost damage are likely to be higher because there is more crop to be damaged and the potential for per hectare losses are greater. In WA in particular, this is compounded by the fact that, over the past 30 years, the incidence of frost has increased in many parts of the wheat belt.

LOCATE THE PROBLEM

Paddock management can do very little to address the risk of extreme, widespread, 'one in 20 years' frost events. However, for year to year frost risk management the key is to identify frost prone paddocks or areas. Frost damage is most frequent, and most severe, in 'frost pockets', which can vary greatly in size, depending on topography and related factors. Physically mapping or marking areas identified as frost prone will enable growers to target frost management strategies to these high-risk areas. The following recommendations apply to identified frost prone paddocks or areas within farms. They represent the best available science-based options to reduce the risk of losses from frost.

BEST BET RISK STRATEGIES

Research over the past four years has identified the most effective strategies to reduce the risk of crop damage and losses due to frost. These strategies have been developed for the western region, however strategies 2, 3 and 4 are equally applicable to the northern region. The results of trials testing agronomic methods for managing frost risk – and the economics of these options – are being further analysed in the southern region.

1 WHEAT VARIETY CHOICE

Long-season wheat varieties frequently avoid frost because they flower later in the growing season, when frost incidence is less. Sowing these varieties in the middle or end of your wheat program, rather than first, further reduces frost risk. The best varieties to use in this way will vary from state to state. The downside of this strategy is that it increases the risk of the crop running out of moisture before it can set seed. However, soils in low lying frost prone areas often have the ability to store subsoil moisture, so the yield penalty from delaying seeding may not be as severe as it would be in drier soil higher in the landscape. Detailed information about maximising yield potential while minimising frost risk is available for the northern region using WHEATMAN software and in Wheat varieties for DLS 2006' (DDVIUF).

2 SOW BARLEY

Barley is usually 2°C more tolerant to frost than wheat and at current price levels, returns from barley are competitive with those from wheat.

3 SOW OATS

Oats are even more frost tolerant than barley (approximately 4°C more tolerant than wheat).

4 GROW HAY

Growing hay on high frost risk paddocks is a good frost avoidance strategy. If severe frost damage occurs baling for hay may reduce economic loss.

5 AVOID HIGH INPUTS

Reduce financial risk exposure by keeping input costs down in frost-prone paddocks. Aim for a consistent, long-term average rather than using a high input strategy aimed at peak yields.

High-input crops on frost-prone areas are frequently more severely frost-damaged than lower-input crops with a lower target yield. Reducing inputs also reduces the financial exposure to frost on high risk paddocks.

Recent WA work shows that reducing fertiliser inputs and seed rates reduces the potential for financial loss and often maintains or improves gross margins when crops are hit by frost.

6 MANAGE NUTRITION

Ensure crops have an adequate supply of trace elements and macro nutrients. supplying high levels will not increase frost tolerance. Crops deficient or marginal in potassium and copper are likely to be more susceptible to frost damage, and this may also be the case for molybdenum.

Don't push crops with high nitrogen rates on high frost-risk paddocks. Crops with access to high nitrogen tend to redden more from frost damage than crops with a lower nitrogen supply. (See graph below)

7 SOW A MIXTURE

Blending two wheat varieties (long and short season) balances frost risk with the risk of end of season drought, and halves the risk of losses from any one frost event. Multiple frost events that damage both varieties are rare. When using this method, grain from both varieties must be suitable for delivery to the same grade if the highest grade is to be achieved.

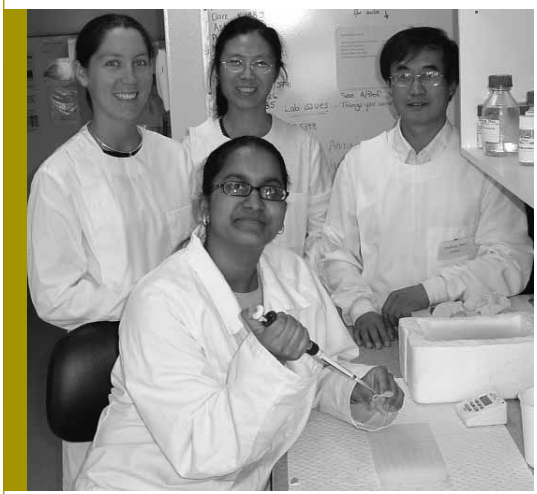
8 CLAY SANDY SOILS

Clayey or delving sandy soils increases the ability of the soil to absorb and hold heat by darkening soil colour and retaining moisture nearer the surface. However, claying can be an expensive practice and requires careful costing before treating large areas.

Nitrogen treatment x frosted grains and yield
Net profit $/ha



*The GRDC distributed a frost advice sheet to over 36,000 graingrowers to help them in minimising frost damage.*



*Ritu Garg, Year 12 student from Mt Lawley High School, has a great interest in genetics and was selected to attend the four-day molecular markers and genetics program through the GRDC Building Human Capacity: Linking Schools to Universities through to Industries scheme.*

**Building human capacity**

'Building Human Capacity: Linking Schools to Universities through to Industries' is an innovative pilot project involving collaboration between the GRDC, the University of Tasmania and the University of Western Australia. The project has been recognised nationally by industry, education and government sectors as successfully creating links, developing capacity and building networks and relationships between schools, universities and industry.

The project operates on three platforms:

- student interaction in the classroom
- a science scholarship comprising one week of attendance at the University of Western Australia followed by a one-week industry placement
- curriculum-based professional development courses for teachers.

By 2006, the third and final year of the pilot, the program had achieved the following outputs in Western Australia:

- participation by 53 schools
- 242 classroom presentations, made to a total of almost 5,000 students
- participation by 53 students in the annual scholarship program
- six two-day professional development workshops, attracting a total of 133 teachers
- production of two CDs, with combined distribution to over 750 participant teachers or schools.

Ritu Garg, a Year 12 student from Mt Lawley High School in Perth, was a 2005 scholarship winner. Ritu spent her one-week industry placement at the Centre for Legumes in Mediterranean Agriculture, where she successfully extracted quality DNA from chickpeas and lupins, under the guidance of Fucheng Shan and his team.

'The DNA extraction and generation of molecular markers are so interesting that they deepened my interest in genetics', Ritu commented.

The GRDC and partnering universities have agreed to continue supporting the program beyond its initial three-year term. The aim now is to expand it further within Western Australia and into other states.

**Showcasing the co-investment model**

In September 2005 the GRDC participated in Rewards from Innovation—World's Best Food and Fibre, an all-day event held at Parliament House in Canberra to promote the benefits of the co-investment R&D model.

This was a joint initiative, developed in conjunction with all 14 rural RDCs, to raise awareness of the RDC model among one of the key customer groups—the Australian Government. It provided an ideal opportunity to demonstrate and communicate the outcomes of the existing industry-driven, market-responsive approach to rural innovation. It also delivered the message that the RDC model is not only about investing in research but also about investing in the adoption of R&D outcomes on the farm.

For this event, each RDC provided a written case study on key R&D outputs that had delivered major benefits to their particular industry. The GRDC's case study highlighted a number of initiatives that have delivered demonstrable productivity gains to Australia's grains industry over the past 14 years. To support the written case study, a video presentation (delivered by the GRDC's Managing Director, a grower and a researcher) showcased the grains industry as a successful adoptor of new technologies. The presentation communicated the engagement process, involving growers, researchers and agribusiness, which is an important part of the investment cycle.

The presentation also clearly demonstrated the benefits gained by the grains industry from the strategic use of the grower levy, which has funded a range of innovations including:

- better weed management
- no-till farming
- better crop establishment techniques
- crop agronomy
- a suite of improved seed varieties.

The case study was shortlisted for the Australian Government Prize for Rural Innovation that was presented at the event.

*Mr Terry Enright, GRDC Chair, quizzing one of the young chefs on the fare presented at the 'Rewards from Innovation—World's Best Food and Fibre' event held in Parliament House to showcase the R&D model.*

CASE STUDY

# Supplements boost information access

The GRDC has substantial investments in a number of strategic initiatives, some of which involve as many as 12 projects. Delivering timely information on the progress of multiple research projects related to a particular strategic initiative in a single publication has been increasingly challenging in the past few years. In 2005–06, a pilot communication project began to bundle such information into tailored supplements, which are widely distributed to growers and the broader grains industry at no cost to the GRDC.

Six supplements were produced in the first year, covering grain storage, precision agriculture, nutrient management, farm health and safety, subsoil constraints and pastures. In some instances the supplements covered topics that cut across multiple primary industries. For example, the February 2006 supplement on farm health and safety contained information from a number of reports that were commissioned through the Farm Health and Safety Program, which is jointly supported by the GRDC and six other RDCs. Another example was the June 2006 supplement on pastures, which reported progress on collaborative research between the GRDC, Meat and Livestock Australia and Australian Wool Innovation Ltd.

Recent surveys have found that the supplements are well read and seen as a valuable resource by graingrowers and advisers alike. Comments received from growers and agribusiness people include:

- 'Congratulations on the great effort done on the grain storage supplement'—Queensland departmental officer
- 'I really enjoy your supplements, very informative'—New South Wales grower
- 'Great to be able to access all the recent research information on the same topic in one publication'—Western Australian grower.

Requests for bulk copies of the supplement on farm health and safety were received from Landcare groups, various state mental health services, the Office of the Australian Safety and Compensation Council, agricultural colleges, private agricultural consultants and grower groups. The August 2005 grain storage supplement was in particularly high demand, as bulk copies were requested by seed merchants and silo manufacturers across the country. Demand for copies of the October 2005 precision agriculture supplement exceeded the supply of 46,000 printed copies.

As a result of the success of the pilot program, supplements will become a key information delivery mechanism for the GRDC in future.


*A pilot communication project—the bundling of information into tailored supplements—proved to be very popular with growers and the broader grains industry.*

# Research Horizons course opens up leadership opportunities

In partnership with BRI Australia, the GRDC has supported the Research Horizons course for growers, agribusiness people and members of the research community since 1996. The aim of the course is to broaden the knowledge of potential industry leaders through six days of intensive training delivered by BRI Australia in Sydney over two years. The course consists of two stages, and involves a maximum of 16 participants, who are usually nominated by the GRDC's three regional panels.

The content of the course is extensive and has an element of flexibility to allow topical issues to be addressed. Issues covered include grains R&D, breeding new varieties, marketing, grain quality testing, grain processing, grain food products and nutrition, commercialisation of R&D, quantifying research benefits, and board or company director responsibilities.

Participants who complete the course are encouraged to consider applying for a GRDC regional panel position or to seek involvement in other local, state or national grains industry bodies. Of the 287 people who have participated in the course, eight have taken up GRDC panel positions, four have become GRDC Nuffield Scholars, and two have completed the Australian Rural Leadership Foundation course.

Participants have found this course to be a valuable source of information. Course evaluation forms included the following comments from participants:

- 'It has given us a wide variety of topics with some interesting and thought-provoking issues'—Stage 2 participant, 2006
- 'I found the "exploring overseas wheat markets" and "our future direction into Asia" components of the course of great benefit'—Stage 1 participant, 2005
- 'Reinforced the need for better breeding programs or at least better varieties'—Stage 1 participant, 2005.

The course is consistently highly regarded in the Australian grower community, and interest expressed in the course often exceeds the number of places available.

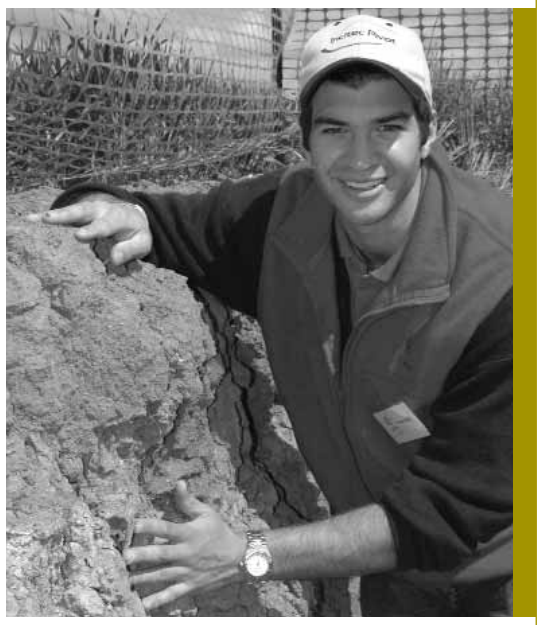

*Research Horizons course participants Pam Krieg, Grenfell, NSW (left), Heather Needs, Lameroo, SA (centre) and Jane Allwright from Dysart, Tasmania, with freshly made noodles in the Asian laboratory at BRI Australia where the course is held.*

**Output Group 4 Communication and Customer Services**

| Investment strategies | Achievements |
|---|---|
| Communication and customer services | Mechanisms in place to deliver targeted information to meet stakeholder needs included:<br>• a communication plan, developed and implemented in collaboration with the National Variety Trials (NVT) service provider, the Australian Crop Accreditation System, to deliver the first year's results from the NVT—this included development of the website www.nvtonline.com.au<br>• grower and adviser research updates, involving GRDC-funded researchers and international speakers, to transfer knowledge on investment outputs<br>• 18 grower workshops, conducted across Australia by the Australian Centre for Intellectual Property in Agriculture, to raise awareness and understanding of plant breeder's rights, End Point Royalties and related contractual issues.<br>Information, products and services developed for the GRDC's customers during 2005–06 included:<br>• a joint project with the Kondinin Group to revise *The Wheat Book*, an educational resource for children aged between ten and 14 years<br>• the development of an audio CD presenting the latest grains industry technical and agronomic information from the 2005 GRDC research update series, targeting over 1,000 advisers and industry specialists<br>• *Driving Agronomy*, an audio CD on new research initiatives, distributed to over 38,000 growers and advisers<br>• a booklet on cereal growth stages that includes management strategies for disease control and canopy management<br>• maize and sorghum *Ute Guides* for growers in the Northern Region. |
| Research capacity | GRDC activities supporting research capacity, to meet the current and future needs of the Australian grains industry, included sponsorships for:<br>• Simon Craig, the recipient of the Science and Innovation Award for Young People in Agriculture, Fisheries and Forestry 2005<br>• Safaa Kumari, a visiting fellow from the Interntional Centre for Agricultural Research in the Dry Areas in Syria, who developed tests to enable accurate detection of viruses in pulses to minimise pulse yield losses<br>• Eric Wright, a La Trobe University student, who began studying characterisation on the XERO2 system in *Arabidopsis thaliana* in February 2006, with funding from a three-year grains industry research scholarship<br>• two graingrowers who visited Brazil to evaluate the potential of Brazilian disc planters for use in Australian conditions.<br>The GRDC worked with research partners to communicate research directions through:<br>• a media campaign to announce the establishment of the international joint venture Philom Bios (Australia) Pty Ltd, which will develop and commercialise high-value biological soil inoculants<br>• a joint communication approach between the GRDC and CSIRO to gain stakeholder input into and information for inclusion in the Crop Biofactories Initiative. |

**Output Group 4 Communication and Customer Services** *(continued)*

| Investment strategies | Achievements |
|---|---|
| Research capacity | Activities to improve the interaction between researchers and the GRDC's target audiences included:<br>• grains research updates and agribusiness updates, which collectively attracted over 3,600 participants across Australia<br>• grower update programs conducted in each of the GRDC's three production regions<br>• a stripe rust advice flyer, *Resistant varieties vital to rust management*, that was distributed to all growers in December 2005, through a national campaign, to address the high incidence of stripe rust infection that occurred in many areas of Australia<br>• a collaboration with CSIRO to present the Grains Week 2006 Research Symposium, highlighting 11 research initiatives.<br><br>The GRDC provided secondary school students with a number of opportunities to think of science and agriculture as careers, through:<br>• support of the National Youth Science Forum 2006, which brought some 200 students, aged from 16 to 18 years, to Canberra to learn about the science that drives innovation and discovery<br>• training awards that funded two New South Wales and three Queensland high-school graduates to undertake full-time vocational education and training agricultural courses<br>• a collaborative initiative in Western Australia, where 23 schools were visited and 96 classroom presentations were given by the University of Western Australia's Colin Hawke. Of the 2,000 students involved in the program, 20 were selected for an industry placement camp. |



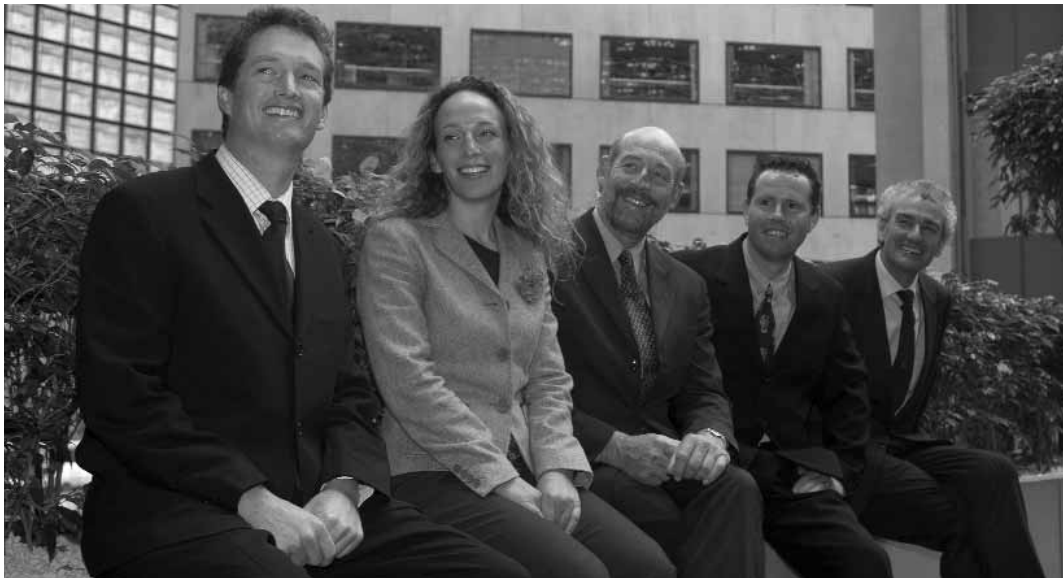
*Simon Craig, a young Birchip Cropping Group researcher, was the winner of the GRDC's 2005 Science and Innovation Award for Young People.* Photo: Richard Henderson

**Output Group 4 Communication and Customer Services** *(continued)*

| Indicators | Performance |
|---|---|
| An increasing proportion of growers adopting new varieties and practices over the past two years due to GRDC activities, identified through an ongoing tracking survey of graingrowers | The 2005–06 national graingrowers survey (based on 1,151 telephone interviews) found that 26% of all growers had been influenced by the GRDC in the adoption of new winter cereal varieties in the previous two years, an increase from 22% recorded in the 2005 survey. |
| An increasing level of customer satisfaction with GRDC organisational performance as a whole, and with the delivery of new and relevant information, products and services in particular, assessed by annual survey of GRDC stakeholders | The 2005–06 survey of graingrowers found that:<br>• growers' overall satisfaction in 2005–06 with the GRDC as an investor in grains R&D remained unchanged from 2004–05, at 74%; however the proportion of growers who rated their satisfaction levels as 'very high' rose from 10% in 2004–05 to 14% in 2005–06<br>• *Ground Cover* continued to be a key delivery mechanism for the GRDC's research outputs, with overall satisfaction with the newspaper remaining high and 94% of graingrowers and 97% of advisers stating that they found it very or fairly useful.<br>A new question in the 2005 government stakeholder survey found that 62% of government stakeholders rated their interaction with GRDC as 'good'.<br>In 2005–06, attendance at grower and adviser research updates grew by 4% nationally. |
| Greater utilisation of GRDC training and travel awards, and enhanced communication and extension of the knowledge and experiences gained | In July 2005 the GRDC provided funding to enable a journalist to travel with an Australian expedition to Armenia to search for genetic traits in ancestral grasses. ABC Radio National, *The Bulletin* magazine and *The Farm Weekly* newspaper extensively reported the trip and outcomes.<br>Funding for Industry Development Awards was doubled in 2005–06, due to an increase in the number and quality of applications.<br>A case study on the 'Impact of various economic instruments on land use change for salinity mitigation of high value assets' by Tenille Graham (a GRDC grains industry research scholar) was presented at the GRDC-sponsored Australian Agricultural and Resource Economics Society Conference. |
| Successful completion of an audit of skills, capabilities and research capacity presently available to support the domestic grains industry | The audit was not completed in 2005–06. Following an internal desktop audit and industry discussions, the GRDC determined that further analysis of the current scientific research capacity and skills was required. The first step will be a pilot research skills audit in the Western Region, to be completed by August 2006. |
| Publication of an audit report that accurately maps existing research capacity and identifies future needs, to include details of the levels and types of support available from all parties (the GRDC and research partners) that contribute to existing research capacity | Because the planned capacity audit was not completed in 2005–06, a report was not published. A pilot research skills audit and a report will be completed by the end of 2006. The report will be validated by industry partners at a workshop. |

**Output Group 4 Communication and Customer Services** *(continued)*

| Indicators | Performance |
|---|---|
| A new strategy in place to address the research capacity needs of the industry, specifying how research capacity is to be strengthened, by whom (responsibility) and by when (timeline); the milestones to be achieved along the way; and resourcing issues | The development of an industry strategy on research capacity will commence when the results of the pilot capacity audit planned for 2006–07 have been collated. |
| The research capacity requirements of GRDC stakeholders and research partners identified via consultation and incorporated into the new strategy | This was not achieved in 2005–06. Key information on the industry's research capacity requirements will be gained from the 2006 audit which will be validated through discussions with industry partners during 2006–07. |



*2006 Nuffield winners David Fulwood, Caroline Brown and Andrew Broad with GRDC Chair Terry Enright (centre) and Southern Region Panel Chair and former Nuffield scholar David Shannon (far right) at the scholarship ceremony in Melbourne.* Photo: Rebecca Thyer

# Commercial objectives

In the GRDC strategic business plan, *The Way Forward*, the commercialisation objective is stated as:

> to leverage capital and expertise from co-investors who maximise the opportunity to bring the technology to the marketplace giving graingrowers access to the technology while at the same time providing a satisfactory return on GRDC's investment.

Commercialisation is one way of securing technology adoption. In some cases, the benefits of GRDC research investments can be most efficiently delivered to our growers through the commercial production of the research outputs. The GRDC's primary aim is to make new technology available to graingrowers as quickly and as cost-effectively as possible.

## Commercialisation strategy

The strategic imperatives of the GRDC's commercialisation strategy are:

- alignment with the corporation's four core strategies, including leveraging of funds, know-how and expertise, and having market-driven R&D
- relevancy to the existing and new strategies of the four lines of business (Varieties, Practices, New Products and Communication and Customer Services)
- identification of investment opportunities and having a complete business plan for delivering benefits to the GRDC's customers.

Usually the GRDC is only one of a number of organisations investing in the development of new technologies by public and/or private organisations. Investment partnerships are desirable and necessary, because they reduce the risk to the GRDC in the funding of new technologies, and because partner organisations can bring benefits, apart from financial resources and research capability, such as market knowledge and access to complementary technologies.

Where the GRDC is a member of a consortium using public and private sector funds, it has influence over the terms of commercialisation, and determines these in collaboration with the other investors to ensure that a proper balance is struck among the needs of all members of the research consortium.

The GRDC continues to seek new business opportunities that arise from its research portfolio, and to seek to provide benefit to growers, to the businesses undertaking the commercial development of new products, and to the GRDC and its research partners. For each commercial business opportunity, the GRDC seeks investment of resources from partners that will profit from the development and widespread uptake of the new technology. This is an important part of using GRDC investment funds to leverage funds from other sources—including, in this area, commercial investment funds—for the benefit of growers.

*Usually the GRDC is only one of a number of organisations investing in the development of new technologies by public and/or private organisations.*

## Commercialisation outcomes

Every commercialisation task is unique, and the process of bringing products and technology to market must be undertaken on a project-by-project basis. A cross-section of commercialisation work undertaken in 2005–06 is described below.

### End Point Royalty review

During the year, the GRDC undertook a review of the End Point Royalty (EPR) system in Australia. The review identified a rapid increase in the adoption of wheat and barley varieties attracting EPRs. It also identified a need for system improvements which potentially could be achieved by using standardised contracts.

In addition, the review highlighted a need for industry to consider better royalty collection mechanisms. Currently, EPR collection appears to work well in Western Australia but is more challenging in northern Australia, particularly where grain is delivered directly to grain users, such as feedlots, rather than passing through bulk-handlers.

The GRDC, in concert with industry, will use the information from the EPR review as a basis to engage industry in discussions on ways to improve the system.

### Soil inoculant technology

Bacteria of the genus *Rhizobium* play a very important role in agriculture by inducing nitrogen-fixing nodules on the roots of legumes such as peas, beans, lucerne and lentils. This symbiotic relationship between soil bacteria and legumes can reduce the requirement for added nitrogenous fertiliser, not only during the growth of leguminous crops but also in cereal crops that follow a legume rotation.

The New Products output group is seeking to build on existing expertise in this area to harness naturally occurring soil biological inoculants to reduce fertiliser costs and improve productivity across the Australian grains industry. GRDC-supported research being carried out by a diverse group of Australian institutions, including CSIRO, the South Australian Research and Development Institute, the New South Wales Department of Primary Industries, the Australian National University, Flinders University and Murdoch University, aims to develop commercial formulations of *Rhizobium* species for legumes.

*In 2005–06, the GRDC was actively involved in the release decisions and tender evaluations for six wheat varieties and five barley varieties.*

These research partners are also working on a suite of other new inoculants for disease suppression, growth promotion and nutrient solubilisation purposes in non-legume crops, including cereals and canola. Several commercial players from Australia and overseas are already active in this market. In 2005–06, the GRDC formed an international partnership with Canadian firm Philom Bios Inc. to test and develop a range of soil inoculant products. The venture was so successful that the partners established a commercial company, Philom Bios (Australia) Pty Ltd, to deliver a range of leading-edge technologies to Australian growers.

### New crop varieties

In 2005–06, the GRDC was actively involved in the release decisions and tender evaluations for six wheat varieties and five barley varieties. This involved making sure that the interests of the owners of the varieties (usually the GRDC and a research partner) were protected after effectively—for the GRDC, this means achieving commercial terms that encourage rapid adoption of superior varieties by growers.

In selecting commercial partners for wheat and barley varieties, the GRDC takes into consideration capabilities such as the ability to produce quality seed, the ability to market seed successfully, and the targets for seed production and variety uptake. The management and collection of EPRs, including the terms and conditions imposed on growers, are also taken into consideration in assessing tender applications.

*GRDC-supported work conducted through Grain Protection Genes continued to bring new technologies closer to market.*

In 2005–06, the GRDC, with its research partners, played an active role in selecting the most appropriate licences to commercialise these new releases. For the state-based wheat and barley breeding programs, this involved advertising nationally for a commercial partner to take up an exclusive licence. For example, a GRDC-funded project with CSIRO Plant Industry produced the dual-purpose winter wheat variety Rudd(Φ). AWB Seeds Pty Ltd won the tender to commercialise this high-yielding, disease-resistant feed wheat variety.

In addition, companies in which the GRDC holds an interest also released several new varieties. For example, Australian Grain Technologies Pty Ltd released wheat varieties Carinya(Φ), Correll(Φ), SUN404B(Φ), VN0870R and VO2697R.

**New pasture varieties**

The National Annual Pasture Legume Improvement Program (NAPLIP) is supported by the GRDC, Australian Wool Innovation Ltd, six state government agriculture agencies and CSIRO. The program comprises scientists and technicians involved in cultivar development, evaluation and demonstration activities, and many more individuals involved across the seed industry in activities from production to cleaning, distribution and sales.

*Peter East, Grain Protection Genes program.* Photo: Brad Collis

As described in more detail in the report of operations for the Practices output group, the program released four new cultivars in 2005–06: Mintaro(Φ), a new subclover; SARDI Persian, the first NAPLIP-bred Persian clover; and Moonbi(Φ) and Wilpena(Φ), the first cultivars of sulla bred in Australia.

The new releases add to the 26 other cultivars produced by the program over a 20-year period. Total releases from NAPLIP now include 11 subclovers, eight annual medics, four serradellas, two balansa clovers and two sullas, as well as cultivars of biserrula, gland clover, burgundy bean, butterfly pea and others.

These cultivars cover the broad spectrum of environments and farming systems across Australia in which pasture legumes play a vital role as both livestock feed and rotation crops. Because 85 percent of crop nitrogen is derived from nitrogen-fixing legumes, the development of new species and the continued improvement of existing cultivars is particularly important for the long-term viability of Australia's cropping industry. NAPLIP pasture cultivars are also highly renowned overseas, in Africa, Europe and South America.

Through commercial arrangements with all of Australia's major seed companies, NAPLIP cultivars have been made widely available on domestic and export markets and are selling in volumes around 500 tonnes per annum. Each year, from Western Australia to Queensland, NAPLIP cultivars are sown from certified seed across half a million to a million hectares of mixed farming lands, and an even larger area is sown from farmer-saved seed.

**Grain Protection Genes projects**

GRDC-supported work conducted through Grain Protection Genes continued to bring new technologies closer to market. Two candidate antifungal genes and a candidate gene for controlling heliothis were transferred to a new gene validation project and progressed through plant proof-of-concept stage during 2005–06. All three genes show sufficient promise to warrant transfer for testing in appropriate crop models.

Also in 2005–06, the first candidate herbicide resistance gene was isolated, and a provisional patent application for the gene was filed. The gene has been transferred to the gene validation project for plant evaluation.

CASE STUDY

# Philom Bios (Australia) Pty Ltd leads soil inoculant development

The development of soil inoculant technology is an area of rapid growth around the world. The GRDC has secured a leading role on behalf of the Australian grains industry, through a commercial collaboration with a Canadian partner.

In November 2003 the GRDC sought expressions of interest from potential partners to commercialise the results of GRDC-supported soil inoculant research. Thirteen expressions of interest, four from Australia and nine from overseas, were assessed against essential selection criteria for technology, capacity and experience in the delivery of soil biology products to graingrowers. In 2004, Philom Bios Inc., based in Saskatoon, Canada, was identified as GRDC's preferred commercial partner.

Philom Bios Inc. has a 25-year history of developing and marketing soil inoculants for legumes, cereals and canola in western Canada. More recently, the company has entered the United States corn and soybean markets. In addition to having technical product development and manufacturing capability, Philom Bios Inc. has a range of unique phosphorus solubilisation and mixed inoculant products with potential to be used under Australian conditions.

In 2005, the GRDC and Philom Bios Inc. entered into an unincorporated joint venture to test and develop a range of inoculants, and to consider establishing a commercial joint venture to which both organisations would contribute capital and intellectual property. This led to the formation of a new commercial company, Philom Bios (Australia) Pty Ltd, on 31 March 2006.

The new company will initially focus on developing and testing a range of new soil inoculant products and delivering them to Australian growers. The first range of products derived from the Canadian parent company will be joined at a later stage by a suite of new products developed by the GRDC's Australian research partners. Products to solubilise phosphorus locked in soils, reduce losses caused by soil disease and promote growth will be introduced over coming years, with an emphasis on the sectors that have previously been unserviced in Australia: cereals and canola.

The GRDC's investment in Philom Bios (Australia) Pty Ltd will both bring forward and increase the benefits from soil inoculant products available to growers in Australia. It will also provide Australian growers direct access to research recognised as the leading edge in agricultural technology.

## Business relationships

Most of the GRDC's business relationships are governed by contracts, such as research agreements and the licences of the resulting intellectual property. However, in several cases the most effective way to encourage adoption of innovation in the grains industry is to enter into a company or unincorporated joint venture. Key reasons for deciding to enter into a company or joint venture include more effective management of intellectual property; more focused governance; ease of interaction with the private sector; and, in the case of CRCs, government policy.

Table 5 describes the companies in which the GRDC had shares or membership in 2005–06. In most cases the GRDC also nominated one or more directors to the company's board.

**Table 5 Companies in which the GRDC has shares or membership**

| Name | Activity | GRDC role |
|---|---|---|
| **Companies limited by guarantee** | | |
| ACAS Ltd | Provides cereal variety details online for farmers, manages the National Variety Trials | Is a member of the company and provides a research contract<br>Nominates a director |
| Agrifood Awareness Ltd | Provides information about gene technology to enable informed debate | Is a member of the company and provides research funding<br>Nominates a director |
| CRC NPB Ltd | Serves as the management company for the CRC for National Plant Biosecurity | Is a member of the company and provides a research contract |
| Export Grains Centre Ltd | Invests in plant breeding | Is a member of the company and provides a research contract<br>Nominates two directors |
| Grain Foods CRC Ltd | Develops innovative grain products | Is a member of the company and provides a research contract<br>Nominates a director |
| Go Grains Health and Nutrition Ltd | Identifies and communicates the health benefits of grain food products | Is a member of the company and provides research funding<br>Nominates a director |
| Pulse Australia Ltd | Provides leadership for the development of the pulse industry in Australia | Is a member of the company<br>Nominates a director |
| Value Added Wheat CRC Ltd | Serves as the management company for the Value Added Wheat CRC | Is a member of the company<br>Nominates a director |
| **Companies limited by shares** | | |
| Australian Centre for Plant Functional Genomics Pty Ltd | Conducts functional genomics research into abiotic stress | Is a 22% shareholder in the company, in return for providing funding of $10 million over five years |
| Australian Grain Technologies Pty Ltd | Undertakes commercial wheat breeding | Is a 45% shareholder and provides research contracts<br>Nominates three of the seven directors |
| Australian Weed Management Pty Ltd | Serves as the management company for the CRC for Australian Weed Management | Has a beneficial interest in one share of the company |
| Philom Bios (Australia) Pty Ltd | Develops and markets inoculant products to benefit growers | Is a 50% shareholder and provides research contracts<br>Nominates two of the four directors |

## Intellectual property management

The corporation usually owns a share of all intellectual property generated by research projects it funds. This consists of registrable intellectual property (plant breeder's rights, patents and trademarks) and non-registrable intellectual property (copyright and trade secrets).

The corporation actively manages its intellectual property, to:

- ensure that research outcomes are adopted as quickly and effectively as possible, by either dissemination or commercialisation
- provide access to GRDC intellectual property and gain access to third-party intellectual property where it will facilitate the delivery of research outcomes to our stakeholders.

The corporation (together with research partners) registers intellectual property where to do so will achieve the above objectives, and maintains a register of its registered intellectual property.

### Patents

The corporation continued to file and prosecute a number of patent applications and to maintain a number of patents, each time in conjunction with research partners.

### Plant breeder's rights

In 2005–06 the GRDC and its research partners:

- lodged 17 new plant breeder's rights applications
- withdrew two new plant breeder's rights applications for plant varieties that will not be commercialised
- surrendered three certificates of plant breeder's rights for plant varieties that have reached the end of their useful commercial lives.

### Trademarks

The corporation lodged no trademark applications in 2005–06, and maintained all of its existing trademarks.

### Subsidiaries

During the year the GRDC had no subsidiaries.


*Ventura wheat seed protected by plant breeder's rights and carrying an end point royalty.* Photo: Kellie Penfold

# Environmental objectives

The GRDC seeks investments that address the environmental concerns represented in the Australian Government's National Research Priorities and the Minister's rural R&D priorities (as shown in Tables 3 and 4), and provide both short-term and long-term economic, environmental and social benefits for the corporation's industry and community stakeholders.

Such investments have a strong focus on identifying profitable solutions to environmental challenges, because profitable solutions are likely to be adopted, as long as they are compatible with existing operations and easily implemented. An assessment of the investment portfolio carried out through the Industry Working Group on Natural Resource Management released during 2005–06 found that 17 percent of the GRDC portfolio is invested in projects that are specifically directed at achieving beneficial environmental outcomes.

The following sections describe some of the environmental successes arising from GRDC investments in 2005–06. The energy-efficient practices the GRDC applies in its own work are discussed in Part 3.

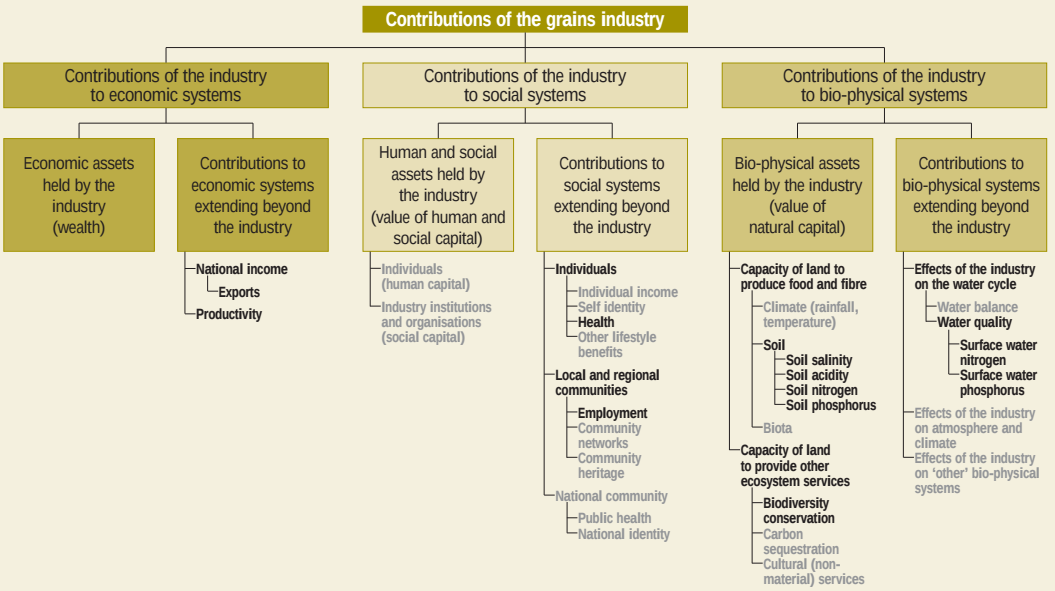
## Assessing the Australian grains industry's contribution to ecologically sustainable development

The GRDC is working in collaboration with the Bureau of Rural Sciences to develop a framework to report on the Australian grains industry's contribution to ecologically sustainable development. This includes an assessment of grains industry contributions to a range of economic, social and environmental outcomes that affect Australia's total quality of life.

An interactive profile brings together economic, social and bio-physical information specific to the grains industry. The economic, social and bio-physical components are repeatedly subdivided to give a comprehensive picture of industry contributions to ecologically sustainable development in space and over time. The profile is also designed to evolve over time in response to new information and input from users. The profile is the first demonstration product of the National Land and Water Resources Audit's Signposts for Australian Agriculture project.

**Figure 10 Interactive grains industry profile**

**FULL COMPONENT TREE** Click on a component to view contents. Components at the tips of the tree contain data. Components higher in the tree provide the context. Components in grey are under development.



This approach provides a robust approach to reporting the triple bottom line benefits of the industry. The information in the framework can be used for strategic planning and to demonstrate the industry's environmentally sustainable development credentials. The framework can be viewed online at www.signposts4ag.com/signposts-grains.

## Developing environmental management systems in partnership with industry

GRDC-supported work has made tailored environmental management systems (EMSs) available to graingrowers at a range of entry levels. The systems range from simple checklists through to systems appropriate for full ISO:14001 certification.

In 2005–06, the GRDC supported an approach being developed by the Grains Council of Australia and the Australian Government's EMS pathways program to assist the majority of graingrowers in demonstrating their environmental assurance credentials. The approach is based on a benchmarking system, using simple spreadsheets. The project aims to provide a convenient tool for grain producers that can be used by individual growers, agroecological zones, major production regions, or the industry as a whole.

The approach works on the premise that the various elements of the modern grain production system used by farmers today are more environmentally sustainable than those used in the late 1970s. For example, chemical use is more restrained, and minimum tillage systems protect the soil surface from erosion by reducing the removal of groundcover. The project gives producers the ability to record their normal farming activities and practices, and includes a straightforward mechanism, based on farmers' own paddock records, to produce environmental performance reports.

While data is currently presented in spreadsheet format, ongoing work is seeking to identify ways to use a database format, as this would allow significantly more flexibility in data reporting and manipulation. The spreadsheets are available from the Grains Council of Australia's website at www.grainscouncil.com/EMS/benchmarking.htm

The work builds on past investments by the GRDC in EMSs, and provides an approach that will benefit the majority of grain growers.

## Adapting to climate change and managing industry greenhouse emissions

*Towards a Single Vision for the Australian Grains Industry*: The Australian Grains Industry Strategy 2005–25 highlights climate change as a major threat to the grains industry. The GRDC, in partnership with the Australian Greenhouse Office and the CRC for Greenhouse Accounting and its partners, has been developing approaches to reduce industry greenhouse gas emissions and to adapt to climate change.

One thing in the climate change debate is certain, and that is that carbon dioxide levels have risen significantly, to the highest levels ever reached, and are continuing to rise. CSIRO climate-modelling work shows that temperatures are likely to increase in the next 30 years over much of the grain belt. Already, work from the Agricultural Production Systems Research Unit in Queensland has shown that the incidence of frost has become less frequent in the northern grains region. Rainfall is likely to decline, especially in Western Australia, where a steep reduction in rainfall and runoff has occurred since 1970. Work by CSIRO and the Department of Agriculture and Food in Western Australia (DAFWA) is providing the industry with a range of likely scenarios for climate change and its impacts both on the farm and across the industry.

*GRDC-supported work has made tailored environmental management systems (EMSs) available to graingrowers at a range of entry levels.*

Nitrous oxide emissions to the atmosphere represent 18 percent of all agricultural greenhouse gas emissions in Australia. In 2005–06, GRDC-supported work with the CRC for Greenhouse Accounting and the Victorian Department of Primary Industries developed some practical approaches to minimising nitrous oxide emissions. The efficient use of nitrogenous fertilisers represents a 'win–win' for both growers and the environment. Efficient fertiliser application means cost savings to growers and reduced emissions to the atmosphere.

Also during 2005–06, industry life-cycle assessment studies conducted by CSIRO and its partners and the Australian Greenhouse Office highlighted critical parts of the maize production chain that need attention in terms of energy use and greenhouse gas emissions. These results build on work previously carried out on wheat production through Curtin University. While post–farm gate emissions are significant, much can be done on-farm to reduce emissions, and the GRDC will continue to provide graingrowers with evidence-based advice in this area.

## Reducing the impact of herbicides through integrated weed management

One of the objectives of the GRDC strategy to invest in integrated weed management is a reduction in the quantity of herbicides being introduced to the environment. In a GRDC-supported research program conducted jointly by DAFWA and Charles Sturt University, weed researchers are exploring the feasibility of using the herbicidal effects of deleterious rhizobacteria to counter Australia's most costly cropping weed, annual ryegrass.

*The GRDC has been a major investor in research to understand and quantify the causes of and potential solutions to dryland salinity.*

By the end of 2005–06, more than 100 bacterial isolates had been identified and were being screened for their ability to reduce annual ryegrass growth. If suitable candidates can be developed as commercially viable soil treatments, farmers will have another alternative to chemical herbicides, reducing impacts on the environment and enhancing the sustainability of farming systems.

## Developing plant-based management of dryland salinity

The GRDC has been a major investor in research to understand and quantify the causes of and potential solutions to dryland salinity. A significant component of this work has been done through a partnership with the CRC for Plant Based Management of Dryland Salinity.

Lucerne is a unique perennial legume in terms of its scale of application, flexibility and pattern of regional use in farming systems. A major feature of lucerne is its capacity to contribute to the management of dryland salinity. This capacity derives from the ability of lucerne's deep roots to use a high proportion of rainfall and the ability of the plant to respond to rainfall occurring outside the winter growing period.

Lucerne is currently grown across 3.2 million hectares, largely in the wheatbelt. A further 27 million hectares across the Australian landscape has potential for lucerne.

Work by the CRC and others has shown that if lucerne is to be integrated successfully in cropping systems growers will need to:

- maximise the use of the lucerne pasture phase and the benefits to livestock enterprises
- optimise the positive benefits flowing from the pasture phase to the subsequent crop
- manage the potential costs and impacts of lucerne on following crops
- manage additional workload and lifestyle preferences.

Lucerne is not adapted to the whole Australian landscape: some soils where salinity control or prevention needs to take place are either too acidic or too low in fertility for the use of lucerne. The CRC has had a major focus on the development of new perennial pasture species that tolerate acidic low-fertility soils.

In situations that are already saline, tolerances to salinity and waterlogging are also required. Species such as *Lotus glaber* have significant salinity and waterlogging tolerances. Work through the CRC is identifying the bases of these tolerances both for the potential use of lotus in pastures and to identify genes for these traits to speed up the development of new salt-tolerant varieties.

Salt tolerance in crops is also a focus of the CRC. Sea barley grass (*Hordium marinum*) is a distant relative of wheat. In a world-first, CRC scientists have been able to cross sea barley grass with wheat to enhance wheat's salt tolerance. The grain from the resultant cross is slightly smaller than wheat and does not have the qualities needed for bread or noodles but should be suitable as a feed grain.

The CRC is developing a range of options for the management of existing species and the development of new species for economic use to manage rising water tables and salinity. The options developed are already providing growers with tools to profitably prevent salinity and use land where salinity occurs.

*Dr Tim Colmer from the Salinity CRC managed to cross a salt-tolerant weed with wheat, to produce the first real chance of growing grain on salt-affected land.* Photo: Evan Collis

# Single Vision Grains Australia

As stated in last year's annual report, following approaches from industry, the GRDC Board agreed at Grains Week 2005 to facilitate the establishment of Single Vision Grains Australia (SVGA) for a period of two years at a cost of up to $1 million per year.

The implementation of SVGA commenced in July 2005 with the appointment of the Interim Board (shown in Table 6). Selwyn Snell was appointed by the Interim Board as Chief Executive Officer in September 2005. SVGA also appointed Matt Kealley as a Business Development Manager and Michelle Fairbrother as Executive Assistant (a part-time position).

In line with industry recommendations, the Interim Board is independent of the GRDC and any other industry organisation. SVGA is not a separate legal entity, but exists through a series of agreements with consultants.

The Interim Board is expected to address various industry-wide issues that were identified by R&D task forces in 2005. By August 2006 the Interim Board had commenced five projects:

- Infrastructure
- Biotechnology and genetically modified crops
- Communications
- Biofuels
- Feed grains.

During the first half of 2006 SVGA conducted a review of wheat export marketing arrangements. In June 2006 SVGA released its report, *Towards a Single Vision for Australian Grain Marketing*. The report evaluated four models of wheat export marketing advanced by industry, with the aim of clarifying the issues and providing a platform for informed decision-making.

A key role for the Interim Board is to seek cross-industry support for SVGA's ongoing operation, and to advise on what form SVGA should take, after the two-year establishment period. The ultimate goal is to create support for a pan-industry body to address common issues facing the grains industry.

In August and September 2006 the GRDC will conduct a review of SVGA performance in its first 12 months, as envisaged when SVGA was established.

**Table 6 Single Vision Grains Australia Interim Board as at 30 June 2006**

| Position | Occupant | Industry enterprise |
|---|---|---|
| Chair | Murray Rogers | Grain marketing, value chain logistics, consumer marketing and food manufacturing |
| Director | Christine Hawkins | Finance, corporate structures, industry strategy and restructuring |
| Director | Grant Latta | Food manufacturing, supply chain and logistics, corporate governance |
| Director | Ian MacKinnon | Grain production |
| Director | Philip Young | Grain production, plant breeding and international consultancy (also a member of the GRDC Board) |

PART THREE

# Our Organisation

# Accountability

The GRDC is accountable to its two key customer groups—the Australian Government and Australian graingrowers—for its performance in addressing their identified priorities. The GRDC also meets its responsibilities under its governing legislation and the broader legal framework for Commonwealth statutory authorities.

## Accountability to the Australian Government

### Responsible minister

Under the *Primary Industries and Energy Research and Development Act 1989* (PIERD Act), the GRDC is made accountable to the Australian Parliament through the Minister for Agriculture, Fisheries and Forestry, the Hon. Peter McGauran MP. The Hon. Sussan Ley MP, Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry, is responsible for research and development corporations, including the GRDC.

### Australian Government priorities

The GRDC continues to proactively address the Australian Government's National Research Priorities and ministerial research priorities for rural R&D corporations. These priorities and the GRDC's achievements in meeting them during 2005–06 are discussed in more detail in Part 2.


*The Hon. Sussan Ley addressing GRDC's Annual Operational Planning Week in March 2006.* Photo: Vic Dobos

### Ministerial directions

Section 143 of the PIERD Act provides that the minister may direct the GRDC with respect to the performance of its functions and the exercise of its powers.

In July 1998, the then Minister issued a direction in accordance with section 16(1)(b) of the *Commonwealth Authorities and Companies Act 1997* (CAC Act) and section 15(2) of the PIERD Act requiring the GRDC to comply with the reporting requirements of the *Guidelines on Funding of Consultation Costs by Primary Industry and Energy Portfolio Statutory Authorities.*

On 15 December 2004, the GRDC received ministerial directions relating to the Finance Minister's (CAC Act Procurement) Directions 2004. The GRDC is complying with the directions.

### General policies of the government

Under section 28 of the CAC Act, the Minister may notify the GRDC Board of any general Australian Government policies that apply to the GRDC.

As at 25 September 2006, the following notifications had been received:

- Commonwealth Fraud Control Guidelines 2002, 21 August 2002
- Finance Circular No. 2002/01—Foreign Exchange (FOREX) Risk Management, 28 August 2002
- Finance Circular 2005/05—Investment of surplus money, 19 May 2005
- Australian Government Property Ownership Framework, 8 November 2005.

The GRDC is complying with the notified policies.

## Accountability to the grains industry

**Industry representative**

Under the PIERD Act, the GRDC is made accountable to Australian graingrowers through the industry's representative organisation, the Grains Council of Australia (GCA).

**Grains industry priorities**

In setting directions for 2005–06 (the fourth year of *Driving Innovation*), the GRDC identified industry priorities through consultation with the GCA and through graingrower workshops. The key industry priorities were incorporated into the GRDC Annual Operational Plan 2005–06 and included:

- sustainability and resource management
- new and innovative product development
- development of new alliances and links to market
- bringing biotechnology to bear on sustainability and consumer benefit outcomes, to support profitable farming systems and access to premium markets
- effective and targeted transfer and adoption of technology and knowledge for Australian growers
- integrated pest management to minimise the total cost of pests, diseases and weeds, and to maintain options and control strategies
- genetic improvement and regional adaptation of new grain varieties for improved resistance to biotic and abiotic stress, and quality standards for specific end uses.

Information on how the GRDC is addressing these priorities is provided in Part 2.

## Stakeholder report

Each year the GRDC prepares a stakeholder report to assist in determining the research levy rates for Australian grain commodities. The report is launched at Grains Week, the industry-wide conference held annually to discuss the performance of, and the prospects for, the Australian grains industry. The conference is the mechanism through which the GRDC formally reports to industry. It also assists the GCA to formulate its advice to the Minister on setting the research levy rates which provide the basis for the corporation's income each year.

## Industry levy rates

In 2005–06, a levy rate of 0.99 percent applied to all leviable crops covered by the GRDC, with the exception of maize, which was levied at 0.693 percent.

The levies were imposed and collected as stipulated by the following legislation:

- *Primary Industries (Excise) Levies Act 1999*, supported by the Primary Industries (Excise) Levies Regulations 1999, Schedules 4, 12, 20 and 25
- *Primary Industries Levies and Charges Collection Act 1991*, supported by the Primary Industries Levies and Charges Collection Regulations 1991, Schedules 8, 19, 29 and 34.

Proceeds from levies in 2005–06 are recorded in Note 5C of the Notes to the Financial Statements.

The GRDC paid the Australian Government Department of Agriculture, Fisheries and Forestry $527,734 for the collection and management of levies in 2005–06.

## Consultation arrangements

The GRDC paid the GCA $106,950 for its participation in consultations with the corporation during 2005–06. The GCA used these funds to meet its costs of preparing for and attending consultative meetings with the GRDC, to consider grains industry strategic directions and concerns and to assess the corporation's performance against industry expectations.

The payments for consultation were made under the *Guidelines on Funding of Consultation Costs by Primary Industries and Energy Portfolio Statutory Authorities*, issued by the Minister for Primary Industries and Energy in July 1998. The guidelines also require that when a representative organisation conducts a project or consultancy on behalf of a statutory authority, details are to be included in the authority's annual report.

Table 7 lists the project funds and conference support that the GRDC provided to the GCA in 2005–06.

**Table 7 GRDC funding for Grains Council of Australia participation in projects and events, 2005–06**

| Project/event | Contribution |
|---|---|
| Grains Week 2006 | $50,000 |
| Pathways to Industry Environmental Management System Project | $20,500 |
| Ministerial Conference of the World Trade Organization, Hong Kong | $17,950 |
| Seed industry consultation and Seed Industry Reference Group | $17,500 |
| Market Access Biosecurity Grains Industry Consultative Committee | $10,700 |
| Ministerial Conference of the World Trade Organization, Geneva | $10,300 |
| Australian Quarantine and Inspection Service Grains Industry Consultative Committee | $8,640 |
| Australian Quarantine and Inspection Service–Pulse Australia Industry Working Group | $3,200 |
| National Agricultural Commodity Marketing Association Commerce Committee | $1,280 |

## Obligations under the *Commonwealth Authorities and Companies Act*

### Accountability

A system of accountability and reporting obligations for the GRDC, reflecting its obligations under the PIERD Act, is set out under the CAC Act. Under the CAC Act, the GRDC is obliged to:

- prepare an annual report (in the prescribed form, including a report of operations), and give it to the responsible minister by 15 October each year (section 9)
- ensure that any subsidiary's financial statements are audited by the Auditor-General (section 12(1))
- prepare and provide to the responsible minister interim reports during a financial year, if required by the Finance Minister by notice in the Gazette (section 13)
- prepare and provide budget estimates (section 14)
- provide the responsible minister (in writing) with particulars of any proposal of the GRDC to undertake any one of a number of significant events (section 15)
- keep the responsible minister informed of the operations of the GRDC and its subsidiaries and provide such reports, documents and information as that minister or the Finance Minister requires (section 16)
- ensure that the general policies of the Australian Government as notified to the corporation are carried out (section 28).

### Conduct of officers

The CAC Act imposes specific standards of general conduct for directors and other officers. Sections 22–27P ensure that officers of Commonwealth authorities are subject to standards of conduct comparable to those required of officers of companies under the *Corporations Act 2001*. Subsection 22(1), which is a civil penalty provision, states:

> An officer of a Commonwealth authority must exercise his or her powers and discharge his or her duties with the degree of care and diligence that a reasonable person would exercise if he or she:
>
> (a) were an officer of a Commonwealth authority in the Commonwealth authority's circumstances; and
>
> (b) occupied the office held by, and had the same responsibilities within the Commonwealth authority as, the officer.

The Act also obliges an officer to:

- exercise his or her powers and discharge his or her duties in good faith in the best interests of the corporation (section 23)

- not make improper use of his or her position or information to gain an advantage for anyone or cause detriment to the corporation or anyone else (section 24 and section 25)
- disclose to a meeting of the Board the nature of any material personal interest in a matter to be considered by the Board and, unless otherwise determined by the Board or the Minister, ensure that he or she is not present at deliberations or takes part in any decision on the relevant subject matter (section 27F to section 27K).

**Sanctions**

A civil penalty regime is contained in the CAC Act (Schedule 2), to deal with any breach by directors of:

- annual reporting rules (section 11)
- their general duty to exercise care and diligence (section 22)
- their general duty to act in good faith (section 23)
- their duty to not make improper use of the position of director to gain an advantage or cause detriment (sections 24 and 25).

## Independent audits

The Auditor-General, under the CAC Act, is required to audit each Commonwealth authority's financial statements. In addition, the *Auditor-General Act 1997* confirms the power of the Auditor-General's staff to carry out performance audits of Commonwealth authorities and, in this role, to obtain documents and information.

The Auditor-General's Independent Audit Report on the GRDC for 2005–06 is presented on pages 102 and 103.

## Judicial decisions and reviews by outside bodies

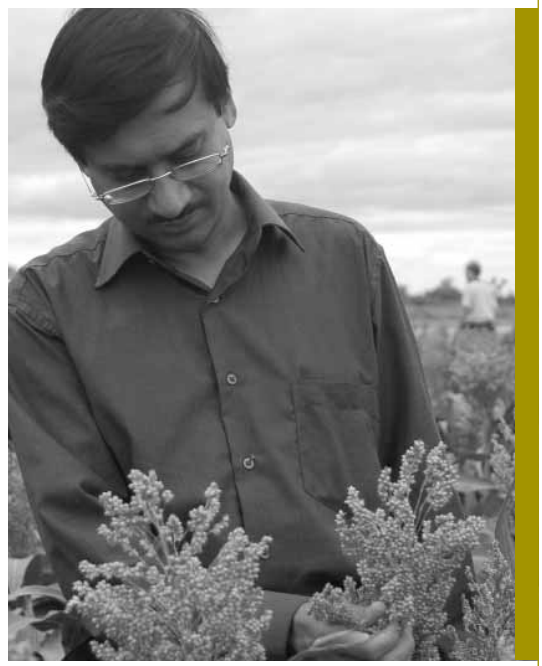
In 2005–06, the GRDC was the subject of one complaint to the Commonwealth Ombudsman. After receiving the GRDC's response to the complaint, the Ombudsman decided not to investigate the complaint further.

In 2005–06 the Minister for Agriculture, Fisheries and Forestry assessed the GRDC against the governance templates recommended in the Review of Corporate Governance of Statutory Authorities and Office Holders (undertaken by John Uhrig AO in 2003). The templates provide for governance by either a board or executive management.

On 9 June 2006 the Minister wrote to the GRDC advising that the board template would continue to apply to each of the rural research and development corporations including the GRDC. The GRDC will also remain a statutory corporation with the right to employ staff under its own terms and conditions. However, the PIERD Act will be amended to remove the appointment of an Australian Government director to the GRDC's Board, and to expand the required skills set of the Board to include expertise in government policy processes and administration.

The Minister also advised that the Government will provide the GRDC with a public Statement of Expectations, to be developed by the Department of Agriculture, Fisheries and Forestry. GRDC is to respond with a public Statement of Intent.

The GRDC was not affected by judicial decisions.



*Dr Iftikhar Mostafa, GRDC Executive Manager for Corporate Strategy and Program Support and National Panel member, inspecting a sorghum crop near Goondiwindi, Queensland.*
Photo: Vic Dobos

# Corporate governance

The GRDC places high value on continuously improving the organisation's corporate governance. Key advances in this area during 2005–06 included:

- detailed review of most polices and procedures
- the design and implementation of new approval authorities
- monthly reviews of business and fraud risks
- an external review of business and fraud risks.

## Policies and procedures

In continuously improving the GRDC's corporate governance, the corporation is guided by the Australian National Audit Office's *Better Practice Guide: Public Sector Governance.*

The GRDC Operating Manual, which is available to the Board and all staff members, describes the corporation's:

- policies and procedures
- roles and responsibilities (including those of the Board and board committees)
- Code of Business Conduct and Ethical Behaviour
- approval authority schedule, which includes delegations
- general guidelines
- management manual.

*The GRDC's Quality Management System has ISO 9001:2000 quality assurance accreditation from SGS International Certification Services Pty Ltd.*

## Risk management and fraud

Risk management has been embraced throughout the GRDC as a tool to assess risks at the strategic, operational and project levels.

The GRDC prepares a quarterly Business Environment Report to the Board. This report is used to update the GRDC's situation analysis and identify developing risks.

The Executive Management Team, in consultation with managers, updates the Business Risk Assessment Report and the Fraud Control Action Plan each month. The Board reviews these documents at each meeting.

Acumen Alliance, the GRDC's internal auditors, conducted a business risk assessment of the GRDC, and prepared a fraud control plan, in the first half of 2006. The outcomes are being progressively included in the GRDC's Business Risk Assessment Report and Fraud Control Action Plan, and communicated through staff training.

## Quality assurance

The GRDC's Quality Management System has ISO 9001:2000 quality assurance accreditation from SGS International Certification Services Pty Ltd. In 2006–07, the GRDC will seek to make greater use of quality assurance as a tool for continuous improvement.

In 2005–06, successful monthly internal audits were conducted by a contracted certified auditor. The GRDC also had a very successful triennial external surveillance audit conducted by SGS International Certification Services Pty Ltd.

These audits demonstrate that the quality management system, based on ISO 9001:2000, is robust, is being used correctly and is a useful tool for business improvement.

## Indemnities and insurance premiums for officers

GRDC officers, including members of the Board, are insured by the GRDC against various liabilities that they may incur in their capacity as officers of the corporation. Since 31 January 1999, Comcover, the Australian Government's self-managed fund for insurance risks, has provided the necessary insurance cover. The Comcover insurance contract prohibits the GRDC from disclosing the nature or limit of the liabilities covered or the amount of premiums payable.

## Environmental objectives

The GRDC is required to report annually on its performance in relation to ecologically sustainable development (ESD) and other environmental matters discussed in section 516A of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The principles of ecologically sustainable development have been incorporated into the decision-making systems and processes of the GRDC, as required under the EPBC Act. The corporation has in place paper-recycling arrangements and, where operationally viable, purchases energy-efficient equipment. Energy-efficient practices are encouraged within the corporation's premises, to reduce energy consumption wherever possible.

At the strategic level, *Driving Innovation* articulates the GRDC's vision for an Australian grains industry that is both profitable and environmentally sustainable. The GRDC strategic business plan, *The Way Forward*, outlines how the GRDC is implementing that vision. The corporation aims to balance its investments to provide long-term and short-term economic environmental benefits for its stakeholders. Part 2 of this annual report includes a discussion of how GRDC investments helped to achieve environmental objectives in 2005–06.

*At the strategic level,* Driving Innovation *articulates the GRDC's vision for an Australian grains industry that is both profitable and environmentally sustainable.*

## Privacy Commissioner

The corporation's privacy policy and procedures form part of the GRDC Operating Manual.

The GRDC's annual *Personal Information Digest* entry as at 30 June 2006 has been lodged with the Privacy Commissioner. The online digest may be viewed at the Commissioner's website, www.privacy.gov.au.

## Freedom of information

The GRDC is required to comply with the *Freedom of Information Act 1982* (FOI Act).

One request under the FOI Act was received during 2005–06.

For more information about the GRDC's information product line, see Appendix 4 and www.grdc.com.au.

Enquiries about access to documents and other matters relating to freedom of information should be directed during normal working hours to:

Freedom of Information Officer
Grains Research and Development Corporation
PO Box 5367
KINGSTON ACT 2604

Telephone: 02 6272 5525
Facsimile: 02 6271 6430

## Service Charter

The GRDC provides a wide range of publications for government and grower stakeholders as well as the wider community. The GRDC Service Charter, available through www.grdc.com.au, outlines the corporation's commitment to delivering these important resources.

# Board

The GRDC Board is responsible for the stewardship of the corporation, and oversees corporate governance within the GRDC. Its other functions include setting strategic direction, and monitoring the ongoing performance of the business and of the Managing Director.

The Board has combined expertise in business management; corporate governance; commodity production; processing and marketing; finance; risk management; management and conservation of natural resources and the environment; R&D administration; science, technology and technology transfer; intellectual property management; and sociology.

## Directors as at 30 June 2006

### Terry J Enright

Chair
(Non-executive)

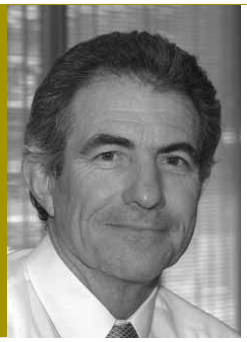
Reappointed:
3 August 2004,
commencing
1 October 2004,
for three years

Member:
Remuneration Committee

Terry runs a grain and livestock business at Mt Barker in Western Australia.

He is a member and former grains councillor of the Western Australian Farmers Federation. He was Deputy Chair of the GRDC from 1999 to 2002 and, prior to that, Chair of the GRDC Western Regional Panel for three years. He has over 15 years experience in directing research investment within the grains industry.

From 1993 to 2003 Terry was Chair of the Albany Port Authority in Western Australia. He is currently an independent board member of Agricultural Research Western Australia. He is also Chair of the Council of Rural R&D Corporation Chairs, a member of the Department of Education, Science and Training standing committee on National Research Priorities, and a member of the Research Quality Framework development advisory committee.



### Peter F Reading

BScAg (Hons), FAICD

Managing Director
(Executive)

Appointed:
February 2004

Peter has been Managing Director of the GRDC since February 2004. He is currently also a Director of the Export Grains Centre, Enterprise Grains Australia and GrainGene III.

Peter was previously the Managing Director of the Grain Pool Pty Ltd. In 2003 he presided over the merger of the Grain Pool Western Australia with Cooperative Bulk Handlers.

Peter graduated from the University of Sydney with an honours degree in agricultural science. He commenced postgraduate studies in agronomy before leaving university to work for American Cyanamid in Australia, Asia and the United States; Incitec in Australia; and British Oxygen Group Asia and the Grain Pool in Western Australia.

### Nicole Birrell

MSc(London School of Economics), FAICD, F Fin

Director
(Non-executive)

Appointed:
1 October 2005
for three years

Member:
Finance, Risk and Audit Committee

Nicole runs a risk management consulting business, and a mixed farming enterprise at Corowa, New South Wales. Nicole has more than 27 years experience in corporate and investment banking, most recently as Head of Operational Risk and Compliance for the ANZ's Institutional Financial Services division.

Previously a Director of AusBulk Ltd and the Chair of AusMalt Pty Ltd, Nicole is currently a Director of SMS Management and Technology Ltd, and member of the Audit, Compliance and Risk Committee; a Director of the Australian Practice Nurses Association Inc., and Chair of the Audit and Risk Management Committee; and a member of the Programs Advisory Committee for the School of Applied Economics at Victoria University, Melbourne.

**Ross Johns**
AdDipBusMgt, FAICD

Deputy Chair
(Non-executive)

Reappointed:
1 October 2005
for three years

Chair:
Finance, Risk and Audit Committee

Member:
Remuneration Committee

Ross lives and works in rural Victoria, and has been a graingrower for many years. He is an active member of the Victorian Farmers Federation and a Director of ABB Grain Ltd.

He takes a keen interest in regional affairs, and has participated in many overseas marketing missions. He brings to the GRDC experience in grain production and marketing, business management, sociology, technology transfer and natural resource management.

**Steve Marshall**
BSc(Hons1), MAppSc, FAIFST

Director
(Non-executive)

Appointed:
1 October 2005
for three years

Member:
Remuneration Committee

Steve has a background in food science and technology management. He was Managing Director of Goodman Fielder Ingredients Ltd from 1993 to 1998 and Technology Director of Goodman Fielder Ltd from 1999 to 2001.

He is currently Deputy Chair of the Rural Industries R&D Corporation and a Director of the Australian Rural Leadership Foundation.

**Don Plowman**
BScAg, MScAg, PhD

Director
(Non-executive)

Reappointed:
1 October 2005
for three years

Don is the Executive Director Agriculture and Wine at the South Australian Department of Primary Industries and Resources.

He has more than 25 years experience in managing research, including as a director with the Horticultural R&D Corporation and the Dried Fruits R&D Council, and as a board member for numerous cooperative research centres.

His particular areas of expertise are in administration, R&D, the environment and ecology, natural resource management and technology transfer.

## Directors as at 30 June 2006

### Russell Phillips

BEc, GradDipComp, GradDipAppFin/Inv

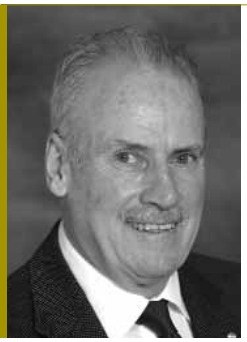
Government Director (Non-executive)

Appointed: 31 August 2005 for three years

Member: Finance, Risk and Audit Committee

Russell is the General Manager for Wheat, Sugar and Crops in the Australian Government Department of Agriculture, Fisheries and Forestry. His team is responsible for providing policy advice and implementing a number of programs that contribute to the global competitiveness of Australia's food and agriculture industries.

He has 25 years experience in public policy and administration covering agriculture, transport and competition issues in a range of Australian Government departments and international agencies.



### Timothy Reeves

BSc(Hons), MAgrSc, FTSE

Director (Non-executive)

Appointed: 1 October 2005 for three years

Timothy Reeves has worked for 39 years in agricultural research, development and extension, mostly focused on sustainable agriculture in Australia and overseas. His professional career includes positions in the Department of Agriculture, Victoria; Foundation Professor of Sustainable Agricultural Production, Adelaide University (1992–95) and Director General of the International Maize and Wheat Improvement Center (CIMMYT) based in Mexico (1995–2002).

Recent roles include: Member, United Nations Millennium Project Task Force on Hunger; Chair, NSW Agricultural Advisory Council on Gene Technology; Member, European Commission Expert Group for Evaluation of Framework Projects; Chair, Academic Advisory Board on International Community and Development Studies, Deakin University; and Professorial Fellow, Melbourne University.

He is a former President of the Australian Society of Agronomy. Timothy has received several international and national honours and is currently a consultant specialising in national and international agricultural research and development.

### Philip Young

BAgSc, MEcon

Director (Non-executive)

Appointed: 1 October 2005 for three years

Member: Finance, Risk and Audit Committee

Philip has been an international agricultural and agribusiness consultant for the past 25 years, with a focus on China.

He owns a share-farmed intensive grain production property at Munglinup on the south coast of Western Australia.

He was the inaugural Chair of Australian Grain Technologies Pty Ltd from 2003 to 2005, and was appointed to the Interim Board of Single Vision Grains Australia in 2005.

## Directors retiring in 2005–06

### Roland Pittar
BScAg (Hons)

Government Director
(Non-executive)

Resigned:
30 August 2005

Member:
Finance, Risk and Audit Committee

During his term on the GRDC Board, Roland Pittar was the General Manager of the Crops, Wine and Horticulture Branch within the Australian Government Department of Agriculture, Fisheries and Forestry (DAFF). His team was responsible for providing policy advice and implementing a number of programs which, by enabling business to perform better and respond to market signals along the value chain, contribute to the global competitiveness of Australia's agriculture and food industries.

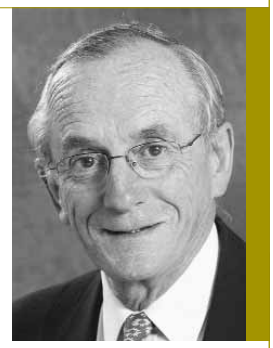
Roland has held a range of policy positions with the Australian Government, which have focused on agriculture, minerals and science policy. He has also worked for a state agriculture department. Since September 2005 Roland has been the DAFF Minister-Counsellor, Agriculture to the Organisation for Economic Co-operation and Development in Paris.

### Tony Fischer
BScAg, PhD, FAIAST, FTSE

Director
(Non-executive)

Resigned:
30 September 2005

Member:
Remuneration Committee



Tony Fischer works part-time at the Australian Centre for International Agricultural Research (ACIAR) in Canberra as an adviser. This involves overseeing ACIAR activities and projects in South Asia. Previously, Tony managed an ACIAR research program, covering crops as well as land and water projects, involving many developing countries. He has been active in research in these fields for over 30 years, at the New South Wales Department of Agriculture, CSIRO, and the International Maize and Wheat Improvement Center (CIMMYT) in Mexico.

From 1988 to 1995 he was director of the Wheat Program at CIMMYT. He has travelled widely in the developing world. He also retains a close interest in a mixed farming property at Boree Creek in southern New South Wales.

### Christine Hawkins
BCom (Hons), MCom, CPA, FAICD

Deputy Chair (Non-executive)
to 30 September 2005

Retired:
30 September 2005

Chair:
Finance, Risk and Audit Committee

Member:
Executive Committee and Remuneration Committee

Christine Hawkins is a corporate adviser and company director. She specialises in high-level strategic organisational planning and development and has a particular interest in the agribusiness sector.

Christine has been involved in recent years in business start-ups, the commercialisation of new products and technologies, and the development of supply chain management and marketing structures in agribusiness.

She has qualifications in economics, accounting, finance and taxation law. She is Chair of the Advisory Committee of Go Grains and a member of the National Rural Advisory Council.

### Rachel Lucas
BSc (Hons), PhD, FAICD, AIMM

Retired:
30 September 2005

Member:
Finance and Audit Committee

Whilst a GRDC Director, Rachel Lucas was Director of Science and Innovation with the Department of Further Education, Employment, Science and Technology in South Australia. She was a non-executive director of Playford Capital and chaired South Australia's Sustainable Energy Research Advisory Committee. In November 2006 she will join Heidrick & Struggles as Principal, working in the life sciences sector. Rachel's background encompasses molecular biology, banking, venture capital, business development and management, strategy development and implementation, R&D administration, technology transfer and intellectual property management. She has many years experience with the food industry through previous involvement with several cooperative research centres. She has brought commercial R&D to market and has extensive experience in negotiating and implementing commercial agreements.

## Selection

The Selection Committee, a committee chosen by the Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry, on advice from the GCA, nominates six of the nine GRDC directors. Appointment of directors nominated through this mechanism is subject to ministerial approval.

The Chair and the Government Director are selected and appointed by the parliamentary secretary. The Board appoints the Managing Director. With the exception of the Managing Director and the Government Director, GRDC directors are appointed for three-year terms. The Managing Director holds office at the corporation's pleasure.

On 1 October 2005 a new GRDC Board was appointed, for a three-year period. The Board's nine directors include four new members: Nicole Birrell, Steve Marshall, Tim Reeves and Philip Young. They joined the continuing Chair, Terry Enright, and continuing members Ross Johns and Don Plowman.

Russell Phillips became the new Government Director on 31 August 2005, succeeding Roland Pittar.

On 30 July 2006 the Selection Committee's Presiding Member delivered a copy of his annual report to the Hon. Sussan Ley, MP. A copy of this report is at Appendix 6.

## Roles, responsibilities and code of conduct

The roles and responsibilities of members of the Board, and their code of conduct, are documented in the GRDC Operating Manual. To request a copy of the manual, telephone the GRDC on 02 6272 5525, or send an email to grdc@grdc.com.au

In October 2005 the Board conducted a detailed review of the roles and responsibilities of the Board and its committees. The Board also strengthened the code of conduct, particularly in relation to conflict of interest.

As a result of the review, the Board decided it was no longer necessary to have an Executive Committee to manage the Board's business between meetings.

The Finance and Audit Committee was also renamed the Finance, Risk and Audit Committee, to reflect its greater focus on risk management.

## Committees

The Board receives formal reports from its committees, and any decisions the Board makes in relation to the reports are recorded in the minutes of the subsequent board meeting. Terms of reference are in place for each of the committees described in Table 8.

**Table 8 Board committees as at 30 June 2006**

| Committee | Role | Membership |
|---|---|---|
| Finance, Risk and Audit Committee | Assist the Board in fulfilling its corporate governance responsibilities.<br>Review the corporation's financial reporting process, internal control system, risk management strategy and processes, internal and external audits, and process for monitoring compliance with laws and regulations and the Board's code of conduct.<br>Review the corporation's financial statements. | At least three non-executive directors of the Board. |
| Remuneration Committee | Review and make recommendations to the Board on matters relating to the remuneration and performance of the Managing Director.<br>Review advice from the Managing Director on remuneration and performance policy for the corporation. | The Chair, the Deputy Chair and one other director. |

## Meetings

The GRDC Board holds seven meetings every 12 months: four full quarterly meetings and three other meetings. Each of the latter meetings is combined with a visit to each one of the GRDC regions at least once every 12 months.

Each director's attendance at Board and Board committee meetings during the year is set out in Table 9.

## Independent professional advice

With the Chair's approval, directors may obtain independent professional advice, at the GRDC's expense, on matters arising in the course of their board and committee duties.

## Induction and training

New Board members go through a formal induction process, and there is a process of continuous education for all directors.

## Disclosure of direct and indirect pecuniary interests

In accordance with section 84 of the PIERD Act, the Managing Director must disclose all direct or indirect pecuniary interests that he or she has or acquires in any business or in any body corporate carrying on any business.

**Table 9 Attendance at board and committee meetings, 2005–06**

| Members | Board | | Finance, Risk and Audit Committee | | Remuneration Committee | |
|---|---|---|---|---|---|---|
| | Meetings attended | Meetings held and eligible to attend | Meetings attended | Meetings held and eligible to attend | Meetings attended | Meetings held and eligible to attend |
| Terry Enright | 7 | 7 | | | 4 | 4 |
| Nicole Birrell[a] | 5 | 5 | 3 | 3 | | |
| Tony Fischer[b] | 2 | 2 | | | 0 | 1 |
| Christine Hawkins[b] | 2 | 2 | 1 | 1 | 1 | 1 |
| Ross Johns | 7 | 7 | 4 | 4 | 3 | 3 |
| Rachel Lucas[b] | 2 | 2 | 1 | 1 | | |
| Steve Marshall[a] | 5 | 5 | | | 3 | 3 |
| Russell Phillips[c] | 5 | 6 | 2 | 3 | | |
| Roland Pittar[d] | 1 | 1 | 1 | 1 | | |
| Don Plowman | 7 | 7 | | | | |
| Peter Reading | 7 | 7 | | | | |
| Tim Reeves[a] | 5 | 5 | | | | |
| Philip Young[a] | 4 | 5 | 2 | 3 | | |

a Appointed 1 October 2005.
b Terms completed 30 September 2005.
c Appointed 31 August 2005.
d Resigned 30 July 2005.

Directors must also comply with the CAC Act's requirements regarding material personal interests and with the GRDC's policy and procedures for conflict of interest, which require declarations of conflicts of interest at the start of each board meeting, and regular updates of records of conflict of interest declarations.

## Board Secretary

The role of the Board Secretary is to:

- ensure the correct recording of board minutes, resolutions and action plans
- help ensure that action plans are closed out within agreed time frames
- prepare board agendas
- collate and distribute board papers and other related documents.

Geoff Budd, GRDC General Counsel, is the Board Secretary.

## Relationship with the Executive Management Team

The Executive Management Team (EMT) has seven members: the Managing Director, and the executive managers from each of the six management groups (the four output groups and two enabling functions. The management structure is shown in Figure 7 in Part 1.

The EMT has an advice and implementation role in relation to the Board. The team investigates and recommends matters for the Board to consider. It also implements Board decisions in accordance with approved policies and procedures, including an approval authority schedule that sets out the necessary delegations.

To ensure that the GRDC's operations are monitored and managed efficiently and effectively, the EMT meets regularly, and maintains and updates an annual business schedule.

## Performance monitoring

At the start of each year the Board sets its annual key performance objectives. At each meeting the Board uses a checklist to review performance against those objectives.

The Board engaged Blake Dawson Waldron to conduct reviews of the Board's performance in late 2004 and 2005. Because the Board changed substantially in October 2005, no performance review was conducted in 2005. An external review of board performance is planned for late 2006.

*GRDC National Panel touring the CBH grain terminal based at Albany in WA. Left to right: Katie Cole, Grain Pool Regional Manager for the Albany Zone; GRDC National Panel Members Peter Reading, Vince Logan, Gavin Whiteley and Ian Buss; and Greg Thornton, CBH Albany Terminal Manager.*
Photo: Vic Dobos

# Advisory panels and program teams

The panel system is a key strength of the GRDC. The Board makes decisions with the support of a national advisory panel, informed by the knowledge and experience of three regional panels and four investment program teams. This network helps to ensure that GRDC investments are directed towards the interests of all our stakeholders and the strategic objectives of our programs.

## National Panel

The National Panel comprises the three regional panel chairs and the GRDC's executive managers. The National Panel addresses national R&D priorities across the GRDC investment programs, and advances recommendations on investments to the Board.

In assisting the Board, the panel's key advice functions include reviewing program investment plans; reviewing budget development and allocations; recommending strategic changes in allocations; arbitrating issues of investment allocation or investment strategy; and actioning review recommendations. The National Panel also plays a major role in communicating with research partners and stakeholders.

## Regional panels

The GRDC's three regional panels are composed of graingrowers, agribusiness representatives and scientists and the GRDC executive managers, with provision for other industry experts to participate as appropriate. Regional panel members also participate as members of GRDC program teams.

The regional panels develop and monitor the strategic direction for the regional elements of the GRDC's R&D investments (details of the regions are provided in Figure 8 in Part 1). Supported by the GRDC program managers, panel members assess investment proposals based on selection criteria, and undertake risk analysis of the potential investments. The panels are also responsible for ensuring that investment strategy is responding to the regional and national priorities of stakeholders.

The GRDC Operating Manual covers roles, responsibilities, codes of conduct, remuneration and selection guidelines for panel members. Panel members as at 30 June 2006 are listed in Table 10.

**Table 10 Regional panel membership as at 30 June 2006**

| Panel | Chair | Deputy Chair | Members | |
|---|---|---|---|---|
| Northern Regional Panel | Ian Buss | Di Bentley | James Clark<br>Richard Heath<br>Graeme Wright<br>Michael Southan (half-year only) | David Freebairn<br>Chris Joseph<br>Bill Yates<br>John Harvey<br>Iftikhar Mostafa |
| Southern Regional Panel | David Shannon | Mark Peoples | Jeffrey Arney<br>Merna Curnow<br>Graeme Lukey<br>Andrew Rice<br>Vic Dobos | Andrew Barr<br>Barbara Howlett<br>Allan Mayfield<br>David Wolfenden<br>Vince Logan |
| Western Regional Panel | Dale Baker | Robert Belford | Ralph Burnett<br>Merrie Carlshausen<br>Richard Oliver<br>Ruth Young<br>Gavin Whiteley | David Capper<br>Ben Curtis<br>Neil Young<br>Greg Fraser |

## Program teams

Each of the GRDC's four program teams comprises program managers, panel members from each of the three regions, an executive manager and a panel chair. Depending on the size and complexity of the portfolio, each program team forms several subprograms, as shown in Table 11.

Each program team is responsible for developing, implementing and reviewing the investment strategy within its output group. Other activities include evaluating projects, prioritising potential investment opportunities and monitoring project performance.

**Table 11 Program teams as at 30 June 2006**

| Program team | Subprogram teams |
|---|---|
| Varieties | • Pre-breeding<br>• Wheat and barley<br>• Pulses and oilseeds |
| Practices | • Agronomy, soils and environment<br>• Crop protection<br>• Validation and integration |
| New Products | • New grain products and new farm products |
| Communication and Customer Services | • Capacity building and corporate communications |

*Members of the GRDC's Western panel inspecting a canola crop near Kojonup in Western Australia.* Photo: Vic Dobos

# Our people

The GRDC continued to emphasise the value of its people. Several staff members were given the opportunity to advance within the organisation, and efforts were made to identify potential and provide development opportunities. In a labour market where recruitment was generally difficult due to a shortage of candidates, the GRDC continued to attract a good depth of quality candidates nationally, and attracted former staff members back to the organisation, making significant steps towards becoming an employer of choice.

The GRDC has a culturally diverse staff, with a good mix of age and gender. The corporation values good health, and recognise its obligation as an employer to provide a safe and harmonious workplace where talented people can assist each other to develop skills and knowledge, and work as a team to improve and develop the grains industry of Australia.

## Staff

The GRDC's staff are employed under section 87 of the PIERD Act, which provides that the terms and conditions of employment are to be determined by the GRDC.

As at 30 June 2006, the GRDC employed 50 full-time staff members, including the Managing Director. A staff list is provided in Table 12.

Salary packages for GRDC staff members are set according to information provided by Hay Group International Human Resource Consultants. The GRDC engages Hay Group International Human Resource Consultants to grade each position description against the relevant market and advise the GRDC of an appropriate range of salary rates.

The GRDC also engaged four program consultants, under section 88 of the PIERD Act, in 2005–06.

**Table 12 Staff as at 30 June 2006**

| Management group | Position | Occupant |
|---|---|---|
| **Managing Director's Area** | Managing Director | Peter Reading |
| | Executive Assistant | Wynette Neil |
| **Corporate Services** | Executive Manager | Gavin Whiteley |
| | General Counsel | Geoff Budd |
| | Corporate Lawyer | Rachel Manley |
| | Compliance Officer | Noelia Freitas |
| | Manager Finance | Danielle White |
| | Accountant: Reporting | Nino Divito |
| | Contract Payments Officer | Cathy Wells |
| | Accounts Payable Officer | Kylie McLay |
| | Manager Human Resources | Wendy Neil |
| | Records Management Coordinator | Ross Thompson |
| | Travel Coordinator | Sarah Smith |
| | Receptionist | Ros Walton |
| | Administrative Assistant | Lauren O' Connor |
| | Manager Information Technology Facilities | Tavis Hamer |
| | Network Administrator | Lawrence McLaughlin |
| | Webmaster | Sia Lipapis |
| | Network Support Officer | Tom Vale |

**Table 12 Staff as at 30 June 2006** *(continued)*

| Management group | Position | Occupant |
|---|---|---|
| **Corporate Strategy and Program Support** | Executive Manager | Iftikhar Mostafa |
| | Business Analyst | Vacant |
| | Corporate Strategist Evaluation and Reporting | Zoltan Lukacs |
| | Manager Procurement and Contracting | Cathy Stewart |
| | Contracts Coordinator | Klaudia Skazlic |
| | Administrative Assistant | Lauren Kennelly[a] |
| | Panel Coordinator (National and North) | Shona Tidswell |
| | Panel Support Officer (South) | Desiree Koch |
| | Panel Support Officer (West) | Julia Polkinghorne |
| **Varieties** | Executive Manager | John Harvey |
| | Administrative Coordinator | Merrilyn Baulman |
| | Administrative Assistant | Natasha Dziubinski |
| | Administrative Assistant | Lauren Kennelly[a] |
| | Manager Gene Discovery | Andreas Betzner |
| | Manager Germplasm Enhancement | Richard Brettell |
| | Project Manager Pre-Breeding | Vacant |
| | Manager Wheat and Barley Breeding | Leecia Angus |
| | Manager Pulse/Oilseed Breeding | Brondwen MacLean |
| **Practices** | Executive Manager | Greg Fraser |
| | Program Coordinator | Chrisafina Valakas |
| | Administrative Coordinator | Angela Ditton |
| | Manager Agronomy, Soils and Environment | Martin Blumenthal |
| | Project Manager Practices | Vacant |
| | Manager Crop Protection | John Sandow |
| | Manager Validation and Adoption | Stuart Kearns |
| | Manager Extension and Grower Programs | Tom McCue |
| **New Products** | Executive Manager | Vince Logan |
| | Administrative Coordinator | Manisha Jayawardana |
| | Manager New Farm Products and Services | Paul Meibusch |
| | Manager New Grain Products | John de Majnik |
| **Communication and Customer Services** | Executive Manager | Vic Dobos |
| | Program Support Coordinator | Sonia Yanni |
| | Manager Corporate Communication | Helen Weldon |
| | Manager Publications | Maureen Cribb |

a Lauren Kennelly's role as Administrative Assistant is shared equally between Varieties and Corporate Strategy and Program Support.

Note: Two staff members were on maternity leave.

In addition, the GRDC funded two full-time positions and a part-time administrative position in Single Vision Grains Australia (as shown in Table 13), as well as the Interim Board consisting of five members (as shown in Table 6).

**Table 13 GRDC-funded staff of Single Vision Grains Australia as at 30 June 2006**

| Position | Occupant |
|---|---|
| Chief Executive Officer | Selwyn Snell |
| Business Development Officer | Matt Kealley |
| Executive Assistant (part-time position) | Michelle Fairbrother |

## Location

The six management groups, including the professional staff who manage research contracts and investment opportunities, are located in offices at the following Canberra address:

Level 1
Tourism House
40 Blackall Street
BARTON ACT 2600

The GRDC owns one floor of Tourism House. The GRDC does not own any research facilities.

Single Vision Grains Australia operates from a rented office at:

Suite 17, Level 2
2 Loraine Street
CAPALABA QLD 4157

## Code of conduct

The GRDC Code of Business Conduct and Ethical Behaviour is published as part of the GRDC Operating Manual, and copies of the code are publicly available upon request. A presentation about the code was made to staff early in the year so staff members have a sound understanding of GRDC requirements. The code is included in induction folders for new staff and discussed during the induction sessions.

## Performance management

The GRDC aligns performance measures with strategic direction, and rewards individuals through an annual bonus scheme which promotes excellence in key performance areas. During the year a new performance management system was introduced, establishing a structured approach to reviewing, recognising and improving performance. This system provides employees with constructive feedback on performance against job-related competencies, as well as performance against objectives and areas of responsibilities assigned for the management period.

Individual efforts are recognised, and behaviour which reflects passion, commitment and ownership in relation to GRDC goals is rewarded.

Managers assist in developing accountability and key performance measures to tie operational outcomes to strategic aims. Individual performance is assessed against agreed key result areas and performance indicators twice each year.

*GRDC staff at a team building exercise.*

## Recruitment, training, retention and succession management

The GRDC recruitment process aims for an honest and open exchange of information between the applicant and the organisation in order to identify the right person–organisation match as well as the best skill set for each role.

The corporation places importance on the induction process and recognise the need to provide proper training and support to new staff.

The GRDC aims to identify training that will challenge people and develop their capacity to perform both in their current roles and in future roles in the organisation. Our mid-year and end-of-year performance review process identifies possible career paths for individuals, which contributes to their personal goals and sense of achievement, and assists GRDC succession planning. Individual training plans are agreed formally, as part of that process.

The GRDC partly funded formal study by three staff members during 2005–06, and many staff members attended seminars and training workshops. The Executive Manager Communication and Customer Services and the Executive Manager Practices attended the company directors' course run by the Australian Institute of Company Directors during 2006. One member of staff fast-tracked his Master of Business Administration with GRDC assistance and has since been promoted into a more senior role. Three female managers attended the Women and Leadership forum and gave a presentation on the seminar at a staff briefing, demonstrating the GRDC's commitment to developing female staff members who have leadership potential.

As part of its retention strategy, the GRDC offers all vacancies internally at first. This has led to the retention and development of a number of staff across the organisation. High-performing staff may be identified as showing potential to succeed other staff, and developed for that purpose. This strategy allows the GRDC to retain valuable industry experience. The development partnership gives mutual benefits: it means staff have a reason to stay, and the organisation gains from the long-term employment of valued people.

Current commercial salary surveys are analysed to review financial rewards on an annual basis. Non-financial rewards are also rated highly as reasons why people choose to stay. In particular, long-term career development and organisational culture are motivational factors for staff. A staff climate survey is planned (for October 2006) and the GRDC will compare feedback to the results of a previous survey in order to track the effectiveness of current policies and procedures and identify any new issues or recurrent problems.

*The GRDC staff assembled outside headquarters.*

## Occupational health and safety

The GRDC continued to focus on good health among staff in 2005–06, and implemented a Better Health at Work program during the year. The program emphasised matters relating to health, diet and nutrition; the importance of exercise; and the relation of all of these factors to a feeling of wellbeing. How well people work is closely related to how well they are feeling, so keeping employees feeling good is important.

Some of the features of the program conducted during the year were:

- promoting good nutrition by providing fresh fruit each week
- preventing injuries by increasing awareness of ways to prevent strains and injuries
- increasing awareness of stress and depression and ways to better manage them, including through lectures delivered by employee assistance program counsellors
- supporting a 'quit smoking' campaign
- encouraging exercise by supporting the '10,000 Steps a Day' campaign, providing pedometers and organising staff walks
- providing a free flu immunisation program
- providing a free employee assistance program and counselling service
- providing and maintaining safe plant, systems of work and access to and egress from the workplace
- maintaining information and records relating to health and safety.

During the year there were several instances of staff requiring extended leave due to health or personal problems. The GRDC was able to demonstrate its commitment to staff by adopting an individual approach in each case, allowing in most cases a full and safe return to work. These instances showed a consistent application of policy, while allowing fairness and flexibility in accordance with the circumstances.

Table 14 summarises the key elements of the GRDC's occupational health and safety performance during the year.

**Table 14 GRDC Occupational health and safety performance, 2005–06**

| Indicators | Performance |
|---|---|
| Workstation assessments completed for all GRDC staff | A professional assessor completed and documented workstation assessments for all new and relocated staff members. |
| Training and awareness of occupational health and safety requirements | Important activities conducted during the year included:<br>• the screening of a video on workplace bullying<br>• an information session on the GRDC code of conduct and workplace behaviour<br>• the annual emergency building evacuation practice and fire drill<br>• the annual checking and restocking of the first aid kit. |
| Improved internal security arrangements | Locks on access doors were upgraded<br>The reception area was locked on close of business daily. |
| Workplace facilities maintained to a high standard | Activities to ensure that facilities were well maintained during the year included:<br>• the six-monthly inspection of fire extinguishers<br>• the annual radiation check of microwave ovens<br>• Regular maintenance of water filters. |

## Equal employment opportunity

In 2005–06, the GRDC had 50 full-time positions, and employed staff under terms and conditions consistent with the *Equal Employment Opportunity (Commonwealth Authorities) Act 1987*. The GRDC's equal employment policy is set out in the GRDC Operating Manual. Table 15 compares the age and gender profiles of GRDC staff for the past two financial years.

**Table 15 Staff profile by age and gender, 2004–05 and 2005–06**

| | 20–30 | 30–40 | 40–50 | 50–60 | >60 | Male | Female | Total |
|---|---|---|---|---|---|---|---|---|
| **2004–05** | | | | | | | | |
| **No.** | 16 | 7 | 10 | 12 | 1 | 23 | 23 | 46 |
| **%** | 35 | 15 | 22 | 26 | 2 | 50 | 50 | 100 |
| **2005–06** | | | | | | | | |
| **No.** | 18 | 10 | 7 | 14 | 1 | 22 | 28 | 50 |
| **%** | 36 | 20 | 14 | 28 | 2 | 44 | 56 | 100 |
| **% change** | +1 | +5 | –8 | +2 | 0 | –6 | +6 | |

## Disability strategies

The Commonwealth Disability Strategy and requirements of the *Disability Discrimination Act 1992* are implemented by the GRDC as the need arises.

Accessibility guidelines are followed when the GRDC presents documents on the internet, and large print for any publication is available on request. Mechanisms are in place to ensure that issues or concerns can be dealt with promptly and fairly. Grievances are first discussed with a supervisor, then raised with the Manager Human Resources if necessary, for resolution. The Managing Director may refer the matter to an external provider for assistance if required. Every effort is made to comply with the strategy, while applying the principle of 'reasonable adjustment', in GRDC recruitment processes.

# Financial Statements

Australian National Audit Office

**INDEPENDENT AUDIT REPORT**

**To the Minister for Agriculture, Fisheries and Forestry**

**Matters relating to the Electronic Presentation of the Audited Financial Statements**

This audit report relates to the financial statements published in both the annual report and on the website of Grains Research and Development Corporation for the year ended 30 June 2006. The Corporation's Directors are responsible for the integrity of both the annual report and the web site.

The audit report refers only to the financial statements, schedules and notes named below. It does not provide an opinion on any other information which may have been hyperlinked to/from the audited financial statements.

If the users of this report are concerned with the inherent risks arising from electronic data communications they are advised to refer to the hard copy of the audited financial statements in the Corporation's annual report.

**Scope**

***The financial statements and Directors' responsibility***

The financial statements comprise:

- Statement by Directors and Executive Director;
- Income Statement, Balance Sheet and Statement of Cash Flows;
- Statement of Changes in Equity;
- Schedules of Commitments and Contingencies; and
- Notes to and forming part of the Financial Statements

of the Grains Research and Development Corporation for the year ended 30 June 2006.

The Directors of the Grains Research and Development Corporation are responsible for preparing financial statements that give a true and fair view of the financial position and performance of the Grains Research and Development Corporation, and that comply with the Finance Minister's Orders made under the *Commonwealth Authorities and Companies Act 1997* and Accounting Standards and mandatory financial reporting requirements in Australia. The Directors are also responsible for the maintenance of adequate accounting records and internal controls that are designed to prevent and detect fraud and error, and for the accounting policies and accounting estimates inherent in the financial statements.

***Audit Approach***

I have conducted an independent audit of the financial statements in order to express an opinion on them to you. My audit has been conducted in accordance with the Australian National Audit Office Auditing Standards, which incorporate the Australian Auditing and Assurance Standards, in order to provide reasonable assurance as to whether the financial statements are free of material misstatement. The nature of

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BARTON ACT
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an audit is influenced by factors such as the use of professional judgement, selective testing, the inherent limitations of internal control, and the availability of persuasive, rather than conclusive, evidence. Therefore, an audit cannot guarantee that all material misstatements have been detected.

While the effectiveness of management's internal controls over financial reporting was considered when determining the nature and extent of audit procedures, the audit was not designed to provide assurance on internal controls.

I have performed procedures to assess whether, in all material respects, the financial statements present fairly, in accordance with the Finance Minister's Orders made under the *Commonwealth Authorities and Companies Act 1997* and Accounting Standards and other mandatory financial reporting requirements in Australia, a view which is consistent with my understanding of the Grains Research and Development's financial position, and of its financial performance and cash flows.

The audit opinion is formed on the basis of these procedures, which included:

- examining, on a test basis, information to provide evidence supporting the amounts and disclosures in the financial statements; and
- assessing the appropriateness of the accounting policies and disclosures used, and the reasonableness of significant accounting estimates made by the Directors.

***Independence***

In conducting the audit, I have followed the independence requirements of the Australian National Audit Office, which incorporate the ethical requirements of the Australian accounting profession.

**Audit Opinion**

In my opinion, the financial statements of the Grains Research and Development Corporation:

(a) have been prepared in accordance with the Finance Minister's Orders made under the *Commonwealth Authorities and Companies Act 1997;* and

(b) give a true and fair view of the Grains Research and Development Corporation's financial position as at 30 June 2006 and of its performance and cash flows for the year then ended, in accordance with:

  (i) the matters required by the Finance Minister's Orders; and

  (ii) applicable Accounting Standards and other mandatory financial reporting requirements in Australia.

Australian National Audit Office

Michael White

Executive Director

Delegate of the Auditor-General

Canberra

31 July 2006

# Statement by directors and executive director

In our opinion, the attached financial statements for the year ended 30 June 2006 are based on properly maintained financial records and give a true and fair view of the matters required by the Finance Minister's Orders made under the *Commonwealth Authorities and Companies Act 1997.*

In our opinion, at the date of this statement, there are reasonable grounds to believe that the Corporation will be able to pay its debts as and when they become due and payable.

The Statement is made in accordance with a resolution of the directors.

Signed .....

Mr T J Enright
CHAIRMAN

28 July 2006

Signed .....

Mr P F Reading
MANAGING DIRECTOR

28 July 2006

# Income statement

FOR THE YEAR ENDED 30 JUNE 2006

| | Notes | 2006 $'000 | 2005 $'000 |
|---|---|---|---|
| **INCOME** | | | |
| ***Revenue*** | | | |
| Revenues from government | 5A | 43,065 | 35,742 |
| Interest | 5B | 5,673 | 7,599 |
| Industry contributions | 5C | 60,861 | 64,193 |
| Project refunds | 5D | 1,533 | 1,238 |
| Royalties | 5E | 3,516 | 1,150 |
| Other | 5F | 488 | 69 |
| ***Total revenue*** | | **115,136** | **109,991** |
| ***Gains*** | | | |
| Reversal of previous asset write-downs | 5G | — | 10 |
| ***Total gains*** | | **—** | **10** |
| **TOTAL INCOME** | | **115,136** | **110,001** |
| **EXPENSES** | | | |
| Research and development | 6A | 115,329 | 106,355 |
| Employees | 6B | 5,473 | 5,234 |
| Suppliers | 6C | 5,325 | 5,528 |
| Depreciation and amortisation | 6D | 424 | 361 |
| Write-down and impairment of assets | 6E | 169 | 2,050 |
| **TOTAL EXPENSES** | | **126,720** | **119,528** |
| **Operating result before income tax** | | **(11,584)** | **(9,527)** |
| Income tax equivalent expense | | — | — |
| **OPERATING RESULT** | | **(11,584)** | **(9,527)** |

The Income Statement is to be read in conjunction with the notes to and forming part of the financial statements.

# Balance sheet

AS AT 30 JUNE 2006

| | Notes | 2006 $'000 | 2005 $'000 |
|---|---|---|---|
| **ASSETS** | | | |
| **Financial assets** | | | |
| Cash and cash equivalents | 7A | 12,071 | 10,168 |
| Receivables | 7B | 4,977 | 3,372 |
| Investments under s18 of the CAC Act | 7C | 100,872 | 113,527 |
| Investments – other | 7D | 4,229 | 3,264 |
| ***Total financial assets*** | | **122,149** | **130,331** |
| **Non-financial assets** | | | |
| Land and buildings | 8A, D | 4,590 | 4,750 |
| Infrastructure, plant and equipment | 8B, D | 417 | 467 |
| Intangibles | 8C, D | 505 | 96 |
| Other non financial assets | 8E | 72 | 27 |
| ***Total non-financial assets*** | | **5,584** | **5,340** |
| **TOTAL ASSETS** | | **127,733** | **135,671** |
| **LIABILITIES** | | | |
| **Provisions** | | | |
| Employee provisions | 9A | 660 | 644 |
| ***Total provisions*** | | **660** | **644** |
| **Payables** | | | |
| Suppliers | 10A | 1,072 | 793 |
| Research and development | 10B | 41,859 | 39,538 |
| Contributions not yet utilised | 10C | 1,727 | 697 |
| ***Total payables*** | | **44,658** | **41,028** |
| **TOTAL LIABILITIES** | | **45,318** | **41,672** |
| **NET ASSETS** | | **82,415** | **93,999** |
| **EQUITY** | | | |
| Accumulated surplus | | 957 | 12,158 |
| Asset revaluation reserve | | 1,512 | 1,512 |
| Capital commitment reserve | | 3,133 | 6,266 |
| Contracted research reserve | | 76,813 | 74,063 |
| **TOTAL EQUITY** | | **82,415** | **93,999** |
| **Current liabilities** | | 43,476 | 40,326 |
| **Non-current liabilities** | | 1,842 | 1,346 |
| **Current assets** | | 117,992 | 127,093 |
| **Non-current assets** | | 9,741 | 8,578 |

The Balance Sheet is to be read in conjunction with the notes to and forming part of the financial statements.

# Statement of cash flows

FOR THE YEAR ENDED 30 JUNE 2006

| | Notes | 2006 $'000 | 2005 $'000 |
|---|---|---|---|
| **OPERATING ACTIVITIES** | | | |
| **Cash received** | | | |
| Industry contributions | | 60,845 | 64,271 |
| Commonwealth contributions | | 43,065 | 35,742 |
| Interest | | 7,188 | 7,779 |
| GST recovered from taxation authority | | (1,016) | 11,150 |
| Other | | 4,713 | 2,752 |
| **Total cash received** | | **114,795** | **121,694** |
| **Cash used** | | | |
| Research and development | | (111,691) | (113,772) |
| Employees | | (5,457) | (5,167) |
| Suppliers | | (5,109) | (5,476) |
| **Total cash used** | | **(122,257)** | **(124,415)** |
| **Net cash used by operating activities** | 11(b) | **(7,462)** | **(2,721)** |
| **INVESTING ACTIVITIES** | | | |
| **Cash received** | | | |
| Proceeds from sale of investments (s18) | | 49,784 | 55,686 |
| **Total cash received** | | **49,784** | **55,686** |
| **Cash used** | | | |
| Purchase of property, plant and equipment | | (623) | (105) |
| Purchase of investments (s18) | | (38,663) | (43,956) |
| Purchase of shares | | (1,133) | (1,133) |
| **Total cash used** | | **(40,419)** | **(45,194)** |
| **Net cash from investing activities** | | **9,365** | **10,492** |
| **Net increase/(decrease) in cash held** | | **1,903** | **7,771** |
| Cash at beginning of reporting period | | 10,168 | 2,397 |
| **Cash at end of reporting period** | 11(a) | **12,071** | **10,168** |

The Statement of Cash Flows is to be read in conjunction with the notes to and forming part of the financial statements.

# Statement of changes in equity

FOR THE YEAR ENDED 30 JUNE 2006

| | Accumulated results | | Asset revaluation reserve | | Contracted research reserve | | Capital commitment reserve | | TOTAL EQUITY | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2006 $'000 | 2005 $'000 | 2006 $'000 | 2005 $'000 | 2006 $'000 | 2005 $'000 | 2006 $'000 | 2005 $'000 | 2006 $'000 | 2005 $'000 |
| **Opening balance** | 12,158 | 12,809 | 1,512 | 475 | 74,063 | 79,819 | 6,266 | 9,386 | 93,999 | 102,489 |
| Adjustment for errors | — | — | — | — | — | — | — | — | — | — |
| Adjustment for changes in accounting policies | — | — | — | — | — | — | — | — | — | — |
| **Adjusted opening balance** | 12,158 | 12,809 | 1,512 | 475 | 74,063 | 79,819 | 6,266 | 9,386 | 93,999 | 102,489 |
| **Income and expenses** Net revaluation increment/(decrement) | — | — | — | 1,037 | — | — | — | — | — | 1,037 |
| **Subtotal income and expenses recognised directly in equity** | — | — | — | 1,037 | — | — | — | — | — | 1,037 |
| Net operating result | (11,584) | (9,527) | — | — | — | — | — | — | (11,584) | (9,527) |
| **Total income and expenses** | (11,584) | (9,527) | — | 1,037 | — | — | — | — | (11,584) | (8,490) |
| **Transfer between equity components** | 383 | 8,876 | — | — | 2,750 | (5,756) | (3,133) | (3,120) | — | — |
| **Closing balance 30 June** | 957 | 12,158 | 1,512 | 1,512 | 76,813 | 74,063 | 3,133 | 6,266 | 82,415 | 93,999 |

The Statement of Changes in Equity is to be read in conjunction with the notes to and forming part of the financial statements.

# Schedule of commitments

**AS AT 30 JUNE 2006**

| | 2006 $'000 | 2005 $'000 |
|---|---|---|
| **BY TYPE** | | |
| **Capital Commitments** | | |
| Investments in shares | 3,133 | 6,266 |
| ***Total capital commitments*** | 3,133 | 6,266 |
| **Other Commitments** | | |
| Operating leases | 162 | 146 |
| Research projects forward program | 136,205 | 162,674 |
| ***Total other commitments*** | 136,367 | 162,820 |
| **Commitments Receivable** | (12,397) | (14,802) |
| **Net Commitments by type** | **127,103** | **154,284** |
| **BY MATURITY** | | |
| **Capital Commitments** | | |
| One year or less | 3,133 | 3,133 |
| One year to five years | — | 3,133 |
| ***Total capital commitments*** | **3,133** | **6,266** |
| **Research Project Commitments** | | |
| One year or less | 80,984 | 80,321 |
| From one to five years | 55,221 | 82,353 |
| Over five years | — | — |
| ***Research Project commitments*** | **136,205** | **162,674** |
| **Operating Lease Commitments** | | |
| One year or less | 75 | 92 |
| One year to five years | 87 | 54 |
| Over five years | — | — |
| ***Total operating Lease commitments*** | **162** | **146** |
| **Commitments Receivable** | (12,397) | (14,802) |
| **Net Commitments by maturity** | **127,103** | **154,284** |

NB: Commitments are GST inclusive where relevant.

Capital commitments are GRDC's commitment to purchase shares in Australian Grain Technologies Pty Ltd and to invest in research in the Australian Centre for Plant Functional Genomics Pty Ltd in return for shares.

The Schedule of Commitments is to be read in conjunction with the notes to and forming part of the financial statements.

# Schedule of commitments *(continued)*

**AS AT 30 JUNE 2006**

Operating leases comprise:

| *Nature of the lease* | *General description of leasing arrangement* |
|---|---|
| Motor vehicles – staff | Leased as part of salary packages<br>No contingent rentals exist |
| Photocopiers and fax machines | Photocopiers and fax machines have rental agreements for a period of five years; after this time they are usually replaced with new rental equipment |

Research project forward program commitments are amounts payable in respect of contracted Research Agreements held between the GRDC and research providers as at 30 June 2006.

The Schedule of Commitments is to be read in conjunction with the notes to and forming part of the financial statements.

# Schedule of contingencies

**AS AT 30 JUNE 2006**

| | 2006 $'000 | 2005 $'000 |
|---|---|---|
| **CONTINGENT LIABILITIES** | — | — |
| **CONTINGENT ASSETS** | — | — |
| **Net contingencies** | — | — |

At balance date there are no unquantified or remote contingencies.

The Schedule of Contingencies is to be read in conjunction with the notes to and forming part of the financial statements.

## Note 1. Summary of Significant Accounting Policies

### 1.1 Basis of Preparation of the Financial Statements

The financial statements are required by clause 1(b) of Schedule 1 to the *Commonwealth Authorities and Companies Act 1997* and are a general purpose financial report.

The financial statements have been prepared in accordance with:

- Finance Minister's Orders (being the *Financial Management and Accountability Orders (Financial Statements for reporting periods ending on or after 1 July 2005));*
- Australian Accounting Standards issued by the Australian Accounting Standards Board (AASB) that apply for the reporting period; and
- Interpretations issued by the AASB and Urgent Issues Group that apply for the reporting period.

This is the first financial report to be prepared under the Australian Equivalents to International Financial Reporting Standards (AEIFRS). The impacts of adopting AEIFRS are disclosed at Note 2.

The Income Statement, Balance Sheet and Statement of Changes in Equity have been prepared on an accrual basis and are in accordance with historical cost convention, except for certain assets, which, as noted, are at fair value. Except where stated, no allowance is made for the effect of changing prices on the results or the financial position.

The financial report is presented in Australian dollars and values are rounded to the nearest thousand dollars unless disclosure of the full amount is specifically required.

Unless alternative treatment is specifically required by an Accounting Standard, assets and liabilities are recognised in the Balance Sheet when and only when it is probable that future economic benefits will flow and the amounts of the assets and liabilities can be reliably measured. However, assets and liabilities arising under agreements equally proportionately unperformed are not recognised unless required by an Accounting Standard. Liabilities and assets that are unrecognised are reported in the Schedule of Commitments and the Schedule of Contingencies.

Unless alternative treatment is specifically required under an Accounting Standard, revenues and expenses are recognised in the Income Statement when and only when the flow or consumption or loss of economic benefits has occurred and can be reliably measured.

### 1.2 Significant Accounting Judgments and Estimates

In the process of applying the accounting policies listed in this note, there have been no judgments that have significantly impacted on the amounts recorded in the financial statements.

No accounting assumptions or estimates have been identified that have a significant risk of causing a material adjustment to carrying amounts of assets and liabilities within the next accounting period.

### 1.3 Statement of Compliance

The financial report complies with the Australian Accounting Standards, which include Australian Equivalents to International Financial Reporting Standards (AEIFRS).

Australian Accounting Standards require the Corporation to disclose Australian Accounting Standards that have not been applied, for standards that have been issued but are not yet effective.

The AASB has issued amendments to existing standards, these amendments are denoted by year and then number, for example 2005-1 indicates amendment 1 issued in 2005.

## Note 1. **Summary of Significant Accounting Policies** *(continued)*

### 1.3 Statement of compliance *(continued)*

The table below illustrates standards and amendments that will become effective for the Corporation in the future. The nature of the impending change within the table, has been out of necessity abbreviated and users should consult the full version available on the AASB's website to identify the full impact of the change. The expected impact on the financial report of adoption of these standards is based on the Corporation's initial assessment at this date, but may change. The Corporation intends to adopt all of the standards upon their application date.

| *Title* | *Standard affected* | *Application date** | *Nature of impending change* | *Impact expected on financial report* |
|---|---|---|---|---|
| 2005-1 | AASB 139 | 1 Jan 2006 | Amends hedging requirements for foreign currency risk of a highly probable intra-group transaction. | No expected impact. |
| 2005-4 | AASB 139, AASB 132, AASB 1, AASB 1023 and AASB 1038 | 1 Jan 2006 | Amends AASB 139, AASB 1023 and AASB 1038 to restrict the option to fair value through profit or loss and makes consequential amendments to AASB 1 and AASB 132. | No expected impact. |
| 2005-5 | AASB 1 and AASB 139 | 1 Jan 2006 | Amends AASB 1 to allow an entity to determine whether an arrangement is, or contains, a lease.<br>Amends AASB 139 to scope out a contractual right to receive reimbursement (in accordance with AASB 137) in the form of cash. | No expected impact. |
| 2005-6 | AASB 3 | 1 Jan 2006 | Amends the scope to exclude business combinations involving entities or businesses under common control. | No expected impact. |
| 2005-9 | AASB 4, AASB 1023, AASB 139 and AASB 132 | 1 Jan 2006 | Amended standards in regards to financial guarantee contracts. | No expected impact. |
| 2005-10 | AASB 132, AASB 101, AASB 114, AASB 117, AASB 133, AASB 139, AASB 1, AASB 4, AASB 1023 and AASB 1038 | 1 Jan 2007 | Amended requirements subsequent to the issuing of AASB 7. | No expected impact. |
| 2006-1 | AASB 121 | 31 Dec 2006 | Changes in requirements for net investments in foreign subsidiaries depending on denominated currency. | No expected impact. |
| | AASB 7 Financial Instruments: Disclosures | 1 Jan 2007 | Revise the disclosure requirements for financial instruments from AASB 132 requirements. | No expected impact. |

* Application date is for annual reporting periods beginning on or after the date shown.

## Note 1. **Summary of Significant Accounting Policies** *(continued)*

### 1.4 Revenue

The revenues described in this Note are revenues relating to the core activities of the Corporation.

*Revenues from Government*
Revenue paid to the Corporation under Section 32 of the *Primary Industries and Energy Research and Development Act 1989,* representing 0.5% of the three-year moving average of gross value of production of grains, is for the purpose of funding research and development activities. Revenues from Government are recognised when they are entitled to be received by the Corporation.

*Industry Contributions*
Revenue paid to the Corporation under Section 30 of the *Primary Industries and Energy Research and Development Act 1989,* where a research levy is attached to grain producers' output, is for the purpose of providing funds for research and development. Industry Contributions are recognised when they are entitled to be received by the Corporation.

*Interest Revenue*
Interest revenue is recognised using the effective interest method as set out in AASB 139.

*Project Refunds*
Project refunds are recognised upon receipt of the refund when it relates to prior year's expenditure and when the funds accrued are not required for the completion of the project.

*Royalties*
Royalties are recognised when the royalty is entitled to be received by the Corporation.

### 1.5 Acquisition of Assets

Assets are recorded at cost on acquisition except as stated below. The cost of acquisition includes the fair value of assets transferred in exchange and liabilities undertaken. Financial assets are initially measured at their fair value plus transaction costs where appropriate.

Assets acquired at no cost, or for nominal consideration, are initially recognised as assets and revenues at their fair value at the date of acquisition.

### 1.6 Property (Land and Buildings and Infrastructure), Plant and Equipment

*Asset Recognition Threshold*
Purchases of property, plant and equipment are recognised initially at cost in the Balance Sheet, except for purchases costing less than $2,000, which are expensed in the year of acquisition (other than where they form part of a group of similar items which are significant in total).

The initial cost of an asset includes an estimate of the cost of dismantling and removing the item and restoring the site on which it is located.

*Revaluations*

*Basis*
Land, buildings, infrastructure, plant and equipment are carried at fair value, being revalued with sufficient frequency such that the carrying amount of each asset is not materially different, as at reporting date, from its fair value. Valuations undertaken in any year are as at 30 June.

Fair values for each class of asset are determined as shown below:

| Asset Class | Fair Value Measured at: |
|---|---|
| Land | Market selling price |
| Building | Market selling price |
| Plant and equipment | Market selling price |

### 1.6 Property (Land and Buildings and Infrastructure), Plant and Equipment *(continued)*

Following initial recognition at cost, valuations are conducted with sufficient frequency to ensure that the carrying amounts of assets do not materially differ with the assets' fair values as at the reporting date. The regularity of independent valuations depends upon the volatility of movements in market values for the relevant assets.

Revaluation adjustments are made on a class basis. Any revaluation increment is credited to equity under the heading of asset revaluation reserve except to the extent that it reverses a previous revaluation decrement of the same asset class that was previously recognised through profit and loss. Revaluation decrements for a class of assets are recognised directly through profit and loss except to the extent that they reverse a previous revaluation increment for that class.

Any accumulated depreciation as at the revaluation date is eliminated against the gross carrying amount of the asset and the asset restated to the revalued amount.

*Depreciation*

Depreciable property, plant and equipment assets are written off to their estimated residual values over their estimated useful lives using, in all cases, the straight-line method of depreciation.

Depreciation (useful lives), residual values and methods are reviewed at each reporting date and necessary adjustments are recognised in the current, or current and future reporting periods, as appropriate.

Depreciation rates applying to each class of depreciable asset are based on the following useful lives:

| | 2006 | 2005 |
|---|---|---|
| Buildings on leasehold land | 25 years | 25 years |
| Other infrastructure, plant and equipment | 3 to 5 years | 3 to 5 years |

The aggregate amount of depreciation/amortisation allocated for each class of assets during the year is disclosed in note 6D.

*Assets Purchased with Research Payments*

Assets purchased with research payments may revert to the Corporation at the end of the research project period and will be accounted for appropriately at that date. During the financial year no research assets reverted to the Corporation.

*Impairment*

All assets were assessed for impairment at 30 June 2006. Where indications of impairment exist, the asset's recoverable amount is estimated and an impairment adjustment made if the asset's recoverable amount is less than its carrying amount.

The recoverable amount of an asset is the higher of its *fair value less costs to sell* and its *value in use*. *Value in use* is the present value of the future cash flows expected to be derived from the asset. Where the future economic benefit of an asset is not primarily dependent on the asset's ability to generate future cash flows, and the asset would be replaced if the Corporation were deprived of the asset, *its value in use* is taken to be its depreciated replacement cost.

No indicators of impairment were found for assets at fair value.

### 1.7 Intangibles

The Corporation's intangibles comprise software for the new information management system and other software. These assets are carried at cost.

Intangible assets are amortised on a straight-line basis over their anticipated useful lives as follows:

| | 2006 | 2005 |
|---|---|---|
| Information management system | 2.5 years | 2.5 years |
| Other intangibles | 2.5 years | 2.5 years |

All software assets were assessed for indications of impairment as at 30 June 2006.

## Note 1. **Summary of Significant Accounting Policies** *(continued)*

### 1.8 Employee Benefits

As required by the Finance Minister's Orders, the Corporation has early adopted AASB 119 Employee Benefits as issued in December 2004.

*Benefits*
Liabilities for services rendered by employees are recognised at the reporting date to the extent that they have not been settled.

Liabilities for 'short-term employee benefits' (as defined in AASB 119) and termination benefits due within 12 months are measured at their nominal amounts.

The nominal amount is calculated with regard to the rates expected to be paid on settlement of the liability.

All other employee benefit liabilities are measured as the present value of the estimated future cash outflows to be made in respect of services provided by employees up to the reporting date.

*Leave*
The liability for employee benefits includes provision for annual leave and long service leave. No provision has been made for sick leave as all sick leave is non-vesting and the average sick leave taken in future years by employees of the Corporation is estimated to be less than the annual entitlement for sick leave.

The leave liabilities are calculated on the basis of employees' remuneration, including the Corporation's employer superannuation contribution rates to the extent that the leave is likely to be taken during service rather than paid out on termination.

*Superannuation*
Corporation staff contribute to the Commonwealth Superannuation Scheme (CSS), Public Sector Superannuation Scheme (PSS), Australian Government Employees Superannuation Trust (AGEST) or an approved superannuation scheme of their choice. For CSS and PSS members, the Corporation makes contributions based on the rate determined by the Government Actuary, and for AGEST and other approved superannuation schemes, the employer contributes a minimum of 9% of superannuable salaries. Employer contributions amounting to $689,262 (2005: $567,267) in relation to these schemes have been expensed in the financial statements.

### 1.9 Leases

A distinction is made between finance leases and operating leases. Finance leases effectively transfer from the lessor to the lessee substantially all risks and rewards incidental to ownership of leased non-current assets. An operating lease is a lease that is not a finance lease. In operating leases, the lessor effectively retains substantially all such risks and benefits.

The Corporation has no finance leases. Operating lease payments are expensed on a basis which is representative of the pattern of benefits derived from the leased assets.

### 1.10 Cash

Cash means notes and coins held and any deposits held at call with a bank or financial institution. Cash is recognised at its nominal amount.

### 1.11 Financial Risk Management

The Corporation's activities expose it to normal commercial financial risk. As a result of the nature of the Corporation's business and internal and Australian Government policies, dealing with the management of financial risk, the Corporation's exposure to market, credit, liquidity and cash flow and fair value interest rate risk is considered to be low.

### 1.12 Investments

Investments are initially measured at their fair value.

After initial recognition, financial assets are to be measured at their fair values except for investments in equity instruments that do not have a quoted market price in an active market and whose fair value cannot be reliably measured, which shall be measured at cost.

The Corporation has acquired shares in the following start-up companies:

- Australian Grain Technologies Pty Ltd (holding: 44.95%);
- Australian Centre for Plant Functional Genomics Pty Ltd (holding: 22.39%); and
- Philom Bios (Australia) Pty Ltd (50%).

The above companies conduct research and development activities relating to seed technology, new wheat varieties and soil inoculants. The success and ability to generate future economic benefits are subject to uncertainty and the Corporation believes that this will impair the carrying values of the investments. The Corporation has established a *Provision for diminution of shares* to record a reduction in the value of these investments based on the Corporation's estimate of the trading performance of each company. A review of the trading performance will be done annually and the provision adjusted accordingly. The provision will remain effective until such time as the Corporation believes that the investment would generate sufficient future economic benefits from a successful marketed product or service.

### 1.13 Derecognition of Financial Assets and Liabilities

As prescribed in the Finance Minister's Orders, the Corporation has applied the option available under AASB 1 of adopting AASB 132 and 139 from 1 July 2005 rather than 1 July 2004.

Financial assets are derecognised when the contractual rights to the cash flows from the financial assets expire or the asset is transferred to another entity. In the case of a transfer to another entity, it is necessary that the risks and rewards of ownership are also transferred.

Financial liabilities are derecognised when the obligation under the contract is discharged or cancelled or expires.

For the comparative year, financial assets were derecognised when the contractual right to receive cash no longer existed. Financial liabilities were derecognised when the contractual obligation to pay cash no longer existed.

### 1.14 Impairment of Financial Assets

As described in the Finance Minister's Orders, the Corporation has applied the option available under AASB 1 of adopting AASB 132 and 139 from 1 July 2005 rather than 1 July 2004.

Financial assets are assessed for impairment at each balance date.

Other financial assets carried at cost which were not held to generate net cash inflows, were assessed for indicators of impairment. Where such indicators were found to exist, the recoverable amount of the assets was estimated and compared to the assets carrying amount and, if less, reduced to the carrying amount. The reduction was shown as an impairment loss.

### 1.15 Trade Creditors

Trade creditors and accruals are recognised at their nominal amounts, being the amounts at which the liabilities will be settled. Liabilities are recognised to the extent that the goods and services have been received (and irrespective of having been invoiced).

## Note 1. Summary of Significant Accounting Policies *(continued)*

### 1.16 Research and Development

The Corporation recognises Research and Development liabilities as follows.

- Most Research Agreements require the Researcher to perform services to meet payment criteria. Liabilities are recognised when there is a high probability that the Corporation will pay out remaining funds, such as on receipt of final report and any other criteria as set out in the Research Agreement.

### 1.17 Taxation

The Corporation is subject to taxation (other than income tax) under the laws of the Commonwealth under section 46(1) of the PIERD Act 1989.

Revenues, expenses and assets are recognised net of GST:

- except where the amount of GST incurred is not recoverable from the Australian Taxation Office; and
- except for receivables and payables

### 1.18 Contingent Liabilities and Contingent Assets

Contingent Liabilities and Assets are not recognised in the Balance Sheet but are discussed in the relevant schedules and notes. They may arise from uncertainty as to the existence of a liability or asset, or represent an existing liability or asset in respect of which settlement is not probable or the amount cannot be reliably measured. Remote contingencies are part of this disclosure. Where settlement becomes probable, a liability or asset is recognised. A liability or asset is recognised when its existence is confirmed by a future event, settlement becomes probable (virtually certain for assets) or reliable measurement becomes possible.

## Note 2. The impact of the transition to AEIFRS from previous AGAAP

| | 2005 $'000 | 2004 $'000 |
|---|---|---|
| Reconciliation of total equity as presented under previous AGAAP to that under AEIFRS | | |
| Total equity under previous AGAAP | 93,999 | 102,489 |
| Adjustments to retained earnings | — | — |
| Adjustments to other reserves | — | — |
| Total equity translated to AEIFRS | 93,999 | 102,489 |
| | | |
| Reconciliation of profit and loss as presented under previous AGAAP to AEIFRS | | |
| Prior year profit as previously reported | (9,527) | |
| Adjustments: | | |
| — | — | |
| Prior year profit translated to AEIFRS | (9,527) | |

The cash flow statement presented under previous AGAAP is equivalent to that prepared under AEIFRS.

The Corporation has not restated comparatives for financial instruments. The adjustments between AEIFRS and the previous AGAAP have been taken up at 1 July 2005.

## Note 3. Economic Dependency

The Grains Research and Development Corporation was established in 1990 as a statutory corporation under the *Primary Industries and Energy Research and Development Act 1989* (PIERD Act).

The Corporation is dependent on levies collected from grain producers under the PIERD Act and Commonwealth contributions made by the Commonwealth for its continued existence and ability to carry out its normal activities.

## Note 4. Events Occurring After Reporting Date

The Corporation had no events occurring after the reporting date that would significantly affect its ongoing structure and financial activities.

## Note 5. Income

***Revenues***

| | 2006 $'000 | 2005 $'000 |
|---|---|---|
| **Note 5A – Revenues from Government** | | |
| Commonwealth contributions | 43,065 | 35,742 |
| **Note 5B – Interest** | | |
| Deposits | 5,682 | 5,511 |
| Negotiable certificates of deposit | 759 | 1,120 |
| Floating rate notes | 963 | 1,276 |
| Sub-total interest income | 7,404 | 7,907 |
| Management fee | (263) | (254) |
| Revaluation of investments | (1,468) | (54) |
| | 5,673 | 7,599 |
| **Note 5C – Industry contributions** | | |
| Coarse grains | 14,842 | 13,730 |
| Grain legumes | 5,568 | 5,421 |
| Oilseeds | 5,335 | 5,165 |
| Wheat | 35,116 | 39,877 |
| | 60,861 | 64,193 |
| **Note 5D – Project refunds** | | |
| Cross commodity | 1,023 | 784 |
| Coarse grains | 202 | 87 |
| Grain legumes | 68 | 81 |
| Oilseeds | 47 | 38 |
| Wheat | 193 | 248 |
| | 1,533 | 1,238 |
| **Note 5E – Royalties** | | |
| Cross commodity | 52 | 53 |
| Coarse grains | 225 | 120 |
| Grain legumes | 158 | 200 |
| Oilseeds | 167 | 128 |
| Wheat | 2,914 | 649 |
| | 3,516 | 1,150 |

## Note 5. **Income** *(continued)*

| ***Revenues*** *(continued)* | **2006 $'000** | **2005 $'000** |
|---|---|---|
| **Note 5F – Other** | | |
| Levy penalties | 76 | 70 |
| Groundcover advertising income | 205 | 2 |
| Publications revenue | 206 | — |
| Other income | 1 | (3) |
| | 488 | 69 |

***Gains***

| | **2006 $'000** | **2005 $'000** |
|---|---|---|
| **Note 5G – Reversal of previous asset write-downs** | | |
| Land – asset revaluation increment | — | 10 |
| | — | 10 |

## Note 6. **Operating Expenses**

**Note 6A – Research and development expenses**

| 2006 | Cross-Commodity $'000 | Coarse Grains $'000 | Grain Legumes $'000 | Oilseeds $'000 | Wheat $'000 | Total $'000 |
|---|---|---|---|---|---|---|
| National | 49,880 | 3,457 | 157 | 695 | 10,459 | 64,648 |
| Northern Region | 7,909 | 2,461 | 1,635 | 2,034 | 1,220 | 15,259 |
| Southern Region | 13,800 | 779 | 1,218 | 1,885 | 1,610 | 19,292 |
| Western Region | 9,459 | 263 | 2,242 | 464 | 3,702 | 16,130 |
| TOTAL | 81,048 | 6,960 | 5,252 | 5,078 | 16,991 | 115,329 |
| 2005 | 69,394 | 8,863 | 7,664 | 4,355 | 16,079 | 106,355 |

The aforementioned classification of national and regional payments is usually based on investment recommendations by the three Regional Panels and the National Panel. The project outcomes may, however, have impacts across one or more regions.

| | **2006 $'000** | **2005 $'000** |
|---|---|---|
| **6B. Employee expenses** | | |
| Salaries | 4,470 | 4,206 |
| Superannuation | 689 | 567 |
| Leave and other entitlements | 6 | 67 |
| Separation and redundancies | — | 119 |
| Total employee benefits expenses | 5,165 | 4,959 |
| Payroll tax | 289 | 262 |
| Other | 19 | 13 |
| Total employee expenses | 5,473 | 5,234 |

## Note 6. **Operating Expenses** *(continued)*

| | 2006 $'000 | 2005 $'000 |
|---|---|---|
| **6C. Supplier expenses** | | |
| Supply of goods and services from external entities | 5,305 | 5,469 |
| Operating lease rentals* | 20 | 59 |
| | 5,325 | 5,528 |
| **6D. Depreciation and amortisation** | | |
| Depreciation of property, plant and equipment | 322 | 236 |
| Amortisation of intangible assets | 102 | 125 |
| | 424 | 361 |
| The aggregate of depreciation or amortisation expensed during the reporting period for each class of depreciable asset are as follows: | | |
| Buildings | 160 | 80 |
| Plant and equipment | 162 | 156 |
| Intangibles | 102 | 125 |
| | 424 | 361 |
| **6E. Write-down and impairment of assets** | | |
| Investments (shares) – revaluation decrement | 169 | 2,050 |

* These comprise minimum lease payments only.

## Note 7. **Financial Assets**

| | 2006 $'000 | 2005 $'000 |
|---|---|---|
| **Note 7A – Cash and cash equivalents** | | |
| Interest bearing cheque account | 11,034 | 156 |
| Money market call account | 1,037 | 10,012 |
| | 12,071 | 10,168 |
| **Note 7B – Receivables** | | |
| Debtors – general | 36 | 21 |
| Debtors – research and development | 92 | 379 |
| Industry levies receivable | 84 | 68 |
| Accrued interest | 38 | 19 |
| Accrued income | 1,596 | - |
| GST receivable | 3,128 | 2,885 |
| Other | 3 | - |
| | 4,977 | 3,372 |
| Receivables (gross) are aged as follows: | | |
| Not overdue | 4,883 | 3,248 |
| Overdue by: | | |
| Less than 30 days | 88 | 118 |
| 30 to 60 days | 4 | — |
| 60 to 90 days | — | — |
| more than 90 days | 2 | 6 |
| | 94 | 124 |
| | 4,977 | 3,372 |

## Note 7. **Financial Assets** *(continued)*

*Receivables for Goods & Services*
Credit terms are net 7 days (2005: 7 days).

*Accrued Interest*
The interest rates range from 3.00% to 5.65% (2005: 3.04% to 5.40%) and the frequency of payments range from monthly to quarterly.

| | 2006 $'000 | 2005 $'000 |
|---|---|---|
| **7C – Investments under s18 of the CAC Act** | | |
| Negotiable Certificates of Deposit<br>At market value | — | 4,163 |
| Floating Rate Notes<br>At market value | 10,034 | 22,100 |
| BT Individually Managed Fund –<br>At market value | 45,238 | 43,442 |
| BT Money Market Trust Units @ $1<br>At market value | 5 | 5 |
| UBS Brinson Individually Managed Fund<br>At market value | 45,595 | 43,817 |
| | 100,872 | 113,527 |

*Negotiable Certificates of Deposit*
These securities have terms of up to 1 year. Interest is paid on maturity.

*Floating Rate Notes*
These securities have a term of up to 5 years. Interest is paid monthly, quarterly and half-yearly. Interest rates are fixed every period at Bank Bill Swap Reference Rate plus a margin. The margin varies between 0.27% and 0.40%.

*Individually Managed Funds*
The funds are available at call. Interest rates will vary to reflect varying market interest rates.

*Ministerial Approval*
The Corporation has received approval under paragraph 18(3)(d) of the CAC Act to hold the investments listed above.

| | 2006 $'000 | 2005 $'000 |
|---|---|---|
| **Note 7D – Investments – other** | | |
| *Shares in Unlisted Companies* | | |
| Philom Bios (Australia) Pty Ltd | — | — |
| Provision for diminution of shares | — | — |
| | — | — |
| Australian Grain Technologies Pty Ltd | 8,152 | 7,019 |
| Provision for diminution of shares | (3,924) | (3,755) |
| | 4,228 | 3,264 |
| Australian Centre for Plant Functional Genomics | 1 | — |
| Total investments – other | 4,229 | 3,264 |

The shares held are ordinary shares.

## Note 8. Non-Financial Assets

| | 2006 $'000 | 2005 $'000 |
|---|---|---|
| **8A. Land and buildings** | | |
| Leasehold land – fair value | 750 | 750 |
| Total land | 750 | 750 |
| Buildings on leasehold land – fair value | 4,000 | 4,000 |
| Accumulated depreciation | (160) | — |
| Total buildings | 3,840 | 4,000 |
| Total land and buildings | 4,590 | 4,750 |
| **8B. Infrastructure, plant and equipment** | | |
| Plant and equipment – fair value | 579 | 467 |
| Accumulated depreciation | (162) | — |
| Total infrastructure, plant and equipment | 417 | 467 |
| Movement in asset revaluation reserve | | |
| Increment for land | — | 90 |
| Increment for buildings | — | 960 |
| Increment for plant and equipment | — | (13) |
| | — | 1,037 |
| Increment for land reversed & recognised as revenue (note 5G) | — | 10 |
| **8C. Intangibles** | | |
| Information Management System – at cost | 1,271 | 803 |
| Accumulated depreciation | (802) | (718) |
| | 469 | 85 |
| Software – at cost | 116 | 73 |
| Accumulated depreciation | (80) | (62) |
| | 36 | 11 |
| Total intangibles | 505 | 96 |

All revaluations are conducted in accordance with the revaluation policy stated at Note 1.

## Note 8. **Non-Financial Assets** *(continued)*

### 8D. Analysis of Property, Plant, Equipment and Intangibles

Table A – Reconciliation of the opening and closing balances of property, plant and equipment and intangibles

| | Leasehold Land $'000 | Buildings on leasehold land $'000 | Other Infrastructure, Plant & Equipment $'000 | Computer software – Total Intangibles $'000 | **Total $'000** |
|---|---|---|---|---|---|
| As at 1 July 2005 | | | | | |
| Gross book value | **750** | **4,000** | **467** | **876** | **6,093** |
| Accumulated depreciation/ amortisation | **—** | **—** | **—** | **(780)** | **(780)** |
| Opening net book value | **750** | **4,000** | **467** | **96** | **5,313** |
| Additions | | | | | |
| by purchase | — | — | 112 | 511 | **623** |
| Net revaluation increment/ decrement | — | — | — | — | **—** |
| Depreciation/amortisation expense | — | (160) | (162) | (102) | **(424)** |
| **As at 30 June 2006** | | | | | |
| Gross book value | **750** | **4,000** | **579** | **1,387** | **6,716** |
| Accumulated depreciation/ amortisation | **—** | **(160)** | **(162)** | **(882)** | **(1,204)** |
| **Closing net book value** | **750** | **3,840** | **417** | **505** | **5,512** |

| | **2006 $'000** | **2005 $'000** |
|---|---|---|
| **8E – Other non-financial assets** | | |
| Prepayments | 72 | 27 |

All other non-financial assets are current

## Note 9. **Provisions**

| | **2006 $'000** | **2005 $'000** |
|---|---|---|
| **9A – Employee Provisions** | | |
| Leave | 660 | 644 |
| Aggregate employee entitlement liability | 660 | 644 |
| Current | 379 | 351 |
| Non-current | 281 | 293 |
| | 660 | 644 |

## Note 10. **Payables**

| | 2006 $'000 | 2005 $'000 |
|---|---|---|
| **10A – Suppliers** | | |
| Trade creditors | 181 | 96 |
| Accrued expenses | 891 | 697 |
| | 1,072 | 793 |
| All supplier payables are current | | |
| **10B – Research and development** | | |
| Research and development | 41,859 | 39,538 |
| Current | 40,298 | 38,673 |
| Non-current | 1,561 | 865 |
| | 41,859 | 39,538 |
| **10C – Contributions not yet utilised** | | |
| Contributions paid in advance by third parties towards specific projects | 1,727 | 697 |

## Note 11. **Cash Flow Reconciliation**

*(a) Reconciliation of cash per Balance Sheet to Statement of Cash Flows*

| | | 2006 $'000 | 2005 $'000 |
|---|---|---|---|
| Cash at year end per Statement of Cash Flows | | 12,071 | 10,168 |
| Balance Sheet items comprising above cash: 'Financial Asset-Cash and cash equivalents' | 7A | 12,071 | 10,168 |

*(b) Reconciliation of operating result to net cash used by operating activities:*

| | 2006 $'000 | 2005 $'000 |
|---|---|---|
| Operating result | (11,584) | (9,527) |
| Depreciation and amortisation | 424 | 361 |
| Write down of assets | 169 | 2,050 |
| Revaluation of investments | 1,468 | 55 |
| Reversal of previous asset write-downs | — | (10) |
| Interest accrued on investments | 65 | 128 |
| Changes in assets and liabilities | | |
| (Increase)/decrease in receivables | (1,586) | 1,103 |
| (Increase)/decrease in accrued interest | (19) | (1) |
| Increase/(decrease) in creditors | 3,630 | 3,050 |
| Increase/(decrease) in employee entitlements | 16 | 67 |
| (Increase)/decrease in prepayments | (45) | 3 |
| **Net Cash used by operating activities** | (7,462) | (2,721) |

## Note 12. **Director Remuneration**

| | 2006 | 2005 |
|---|---|---|
| The number of directors of the Corporation included in these figures are shown below in the relevant remuneration bands | | |
| $ Nil – $14,999 | 5 | 2 |
| $15,000 – $29,999 | 5 | 3 |
| $30,000 – $44,999 | 1 | 3 |
| $45,000 – $59,999 | 1 | 1 |
| $390,000 – $405,000 | — | 1 |
| $465,000 – $480,000 | 1 | — |
| The number of directors of the Corporation | 13 | 10 |
| | **$** | **$** |
| Total remuneration received or due and receivable by directors of the Corporation | 711,415 | 607,672 |

The directors of the Corporation, with the exception of the Managing Director, are appointed by the Australian Government Minister for Agriculture, Fisheries and Forestry.

## Note 13. **Related Party Disclosures**

The following persons were Directors of the Grains Research and Development Corporation during the year:

Mr T.J. Enright (Chairman)
Ms C. Hawkins (Deputy Chairman – term finished 30/9/05)
Mr R. Johns (Deputy Chairman – reappointed 1/10/2005)
Mr R. Pittar (Government Director – resigned 31/7/05)
Mr Russell Phillips (Government Director – appointed 31/8/05)
Dr A. Fischer (term finished 30/9/05)
Dr R. Lucas (term finished 30/9/05)
Ms Nicole Birrell (appointed 1/10/05)
Mr Steve Marshall (appointed 1/10/05)
Dr D. Plowman (reappointed 1/10/05)
Prof. Timothy Reeves (appointed 1/10/05)
Mr Philip Young (appointed 1/10/05)
Mr P. Reading (Executive Director)

Several directors of the Corporation hold directorships with other companies. All transactions between the Corporation and companies with a Director common to the Corporation are conducted using commercial and arms-length principles.

The aggregate remuneration of Directors is disclosed in Note 12.

## Note 14. **Executive Remuneration**

| | 2006 | 2005 |
|---|---|---|
| The number of senior executives who received or were due to receive total remuneration of $130,000 or more: | | |
| Between $130,000 – $144,999 | 3 | 6 |
| Between $145,000 – $159,999 | 1 | 1 |
| Between $160,000 – $174,999 | 2 | 2 |
| Between $175,000 – $189,999 | 4 | 1 |
| Between $190,000 – $204,999 | 1 | — |
| | 11 | 10 |
| | **$** | **$** |
| The aggregate amount of total remuneration of officers shown above. | 1,832,538 | 1,491,726 |

The officer remuneration includes all officers concerned with or taking part in the management of the Corporation during 2005-06 except the Managing Director. Details in relation to the Managing Director have been incorporated in Note 12 – Director Remuneration.

## Note 15. **Remuneration of Auditors**

| | 2006 $ | 2005 $ |
|---|---|---|
| The cost of financial statement audit services provided to the Corporation were: | | |
| Australian National Audit Office (ANAO) | 17,500 | 17,000 |
| Other services<br>– Audit of financial information for the first time adoption of AEIFRS | — | 5,500 |

RSM Bird Cameron have been contracted by the Australian National Audit Office to provide audit services on the ANAO's behalf. Fees for these services are included above.

No other services were provided by the Auditor-General or RSM Bird Cameron during the reporting period.

## Note 16. **Average Staffing Levels**

| | 2006 | 2005 |
|---|---|---|
| The average staffing levels for the Corporation during the year were: | 50 | 46 |

## Note 17A – Interest Rate Risk

| Financial Instrument | Notes | Floating Interest Rate | | Fixed Interest Rate Maturing In | | | | | | Non Interest bearing | | Total | | Weighted Average Effective Interest Rate | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1 Year or less | | 1 to 5 years | | > 5 years | | | | | | | |
| | | 2006 $'000 | 2005 $'000 | 2006 $'000 | 2005 $'000 | 2006 $'000 | 2005 $'000 | 2006 $'000 | 2005 $'000 | 2006 $'000 | 2005 $'000 | 2006 $'000 | 2005 $'000 | 2006 % | 2005 % |
| **Financial Assets** | | | | | | | | | | | | | | | |
| Cash | 7A | 12,071 | 10,168 | | | | | | | | | 12,071 | 10,168 | 3.50 | 5.36 |
| Receivables | 7B | | | | | | | | | 4,977 | 3,372 | 4,977 | 3,372 | n/a | n/a |
| Negotiable certificates of deposit | 7C | | | | 4,163 | | | | | | | | 4,163 | | 5.65 |
| Floating rate notes | 7C | | | | 17,082 | 10,034 | 5,018 | | | | | 10,034 | 22,100 | 6.11 | 6.02 |
| Managed funds | 7C | | | 90,838 | 87,264 | | | | | | | 90,838 | 87,264 | 2.73 | 6.09 |
| Shares in unlisted companies | 7D | | | | | | | | | 4,229 | 3,264 | 4,229 | 3,264 | n/a | n/a |
| **Total Financial Assets** | | 12,071 | 10,168 | 90,838 | 108,509 | 10,034 | 5,018 | | | 9,206 | 6,636 | 122,149 | 130,331 | | |
| **Financial Liabilities** | | | | | | | | | | | | | | | |
| Trade creditors | 10A | | | | | | | | | 1,072 | 793 | 1,072 | 793 | n/a | n/a |
| Project liabilities | 10B | | | | | | | | | 41,859 | 39,538 | 41,859 | 39,538 | n/a | n/a |
| Contributions not yet utilised | 10C | | | | | | | | | 1,727 | 697 | 1,727 | 697 | n/a | n/a |
| **Total Financial Liabilities** | | | | | | | | | | 44,658 | 41,028 | 44,658 | 41,028 | | |

**Note 17B – Net Fair Values of Financial Assets and Liabilities**

| | Note | 2006 Total Carrying amount $'000 | 2006 Aggregate net fair value $'000 | 2005 Total Carrying amount $'000 | 2005 Aggregate net fair value $'000 |
|---|---|---|---|---|---|
| **Financial Assets** | | | | | |
| Deposits at call | 7A | **12,071** | **12,071** | 10,168 | 10,168 |
| Receivables | 7B | **4,977** | **4,977** | 3,372 | 3,372 |
| Negotiable certificates of deposit | 7C | **—** | **—** | 4,163 | 4,163 |
| Floating rate notes | 7C | **10,034** | **10,034** | 22,100 | 22,100 |
| Managed funds | 7C | **90,838** | **90,838** | 87,264 | 87,264 |
| Share in unlisted companies | 7D | **4,229** | **4,229** | 3,264 | 3,264 |
| **Total Financial Assets** | | **122,149** | **122,149** | 130,331 | 130,331 |
| **Financial Liabilities** | | | | | |
| Trade creditors | 10A | **1,072** | **1,072** | 793 | 793 |
| Project liabilities | 10B | **41,859** | **41,859** | 39,538 | 39,538 |
| Contributions not yet utilised | 10C | **1,727** | **1,727** | 697 | 697 |
| **Total Financial Liabilities** | | **44,658** | **44,658** | 41,028 | 41,028 |

*Financial Assets*

The net fair values of deposits at call and receivables approximate their carrying amounts.

The net fair value of negotiable certificates of deposit is based on discounted cash flows using current interest rates for assets with similar risk profiles.

The net fair value of floating rate notes are based on discounted cash flows using current interest rates for assets with similar risk profiles.

The net fair value of the Individually Managed Fund is the quoted market value at reporting date, adjusted for the transaction costs necessary for realisation.

The net fair value of shares in unlisted companies is the Corporation's proportion of the estimated net asset position of the company.

*Financial Liabilities*

The net fair values of trade creditors, project liabilities and contributions not yet utilised approximate their carrying amounts.

**Note 17C – Credit Risk Exposures**

The Corporation's maximum exposure to credit risk at reporting date in relation to each class of recognised financial assets is the carrying amount of those assets as indicated in the Balance Sheet.

The Corporation has no significant exposures to any concentrations of credit risk.

## Note 18. **Reporting of Outcomes**

### Note 18A – Outcomes of the Corporation

Corporation activity involves the identification, co-ordination, funding and evaluation of research and development for Australia's grain industries. These financial statements provide a detailed overview of the Corporation's total financial operations for the year ended 30 June 2006. The Corporation operates predominantly in one industry, the grains industry and in one geographical area being Australia.

Outcome 1 – Through its commitment to innovations, an Australian grains industry that is profitable and environmentally sustainable for the benefit of the industry and wider community.

Four outputs are identified for each outcome. The outputs for outcome 1 are:

Output 1 – Varieties
Output 2 – Practices
Output 3 – New Products
Output 4 – Communication and Customer Services

### Note 18B – Net Cost of Outcome Delivery

| | Outcome 1 | | Total | |
|---|---|---|---|---|
| | **2006 $'000** | 2005 $'000 | **2006 $'000** | 2005 $'000 |
| Departmental expenses | **126,720** | 119,528 | **126,720** | 119,528 |
| Total expenses | **126,720** | 119,528 | **126,720** | 119,528 |
| *Other external revenues* | | | | |
| Departmental | | | | |
| Interest | **5,673** | 7,599 | **5,673** | 7,599 |
| Industry contributions | **60,861** | 64,193 | **60,861** | 64,193 |
| Project refunds | **1,533** | 1,238 | **1,533** | 1,238 |
| Royalties | **3,516** | 1,150 | **3,516** | 1,150 |
| Reversal of previous asset write-downs | **0** | 10 | **0** | 10 |
| Other | **488** | 69 | **488** | 69 |
| *Total Departmental* | **72,071** | 74,259 | **72,071** | 74,259 |
| Total other external revenues | **72,071** | 74,259 | **72,071** | 74,259 |
| Net cost/(contribution) of outcome | **54,649** | 45,269 | **54,649** | 45,269 |

**Note 18C – Major departmental Revenue and Expenses by Output Group**

| | Outcome 1 | | | | | | | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Output 1 | | Output 2 | | Output 3 | | Output 4 | | | |
| | **2006 $'000** | 2005 $'000 | **2006 $'000** | 2005 $'000 | **2006 $'000** | 2005 $'000 | **2006 $'000** | 2005 $'000 | **2006 $'000** | 2005 $'000 |
| **Operating expenses** | | | | | | | | | | |
| Research and development | **58,887** | 48,698 | **37,211** | 42,367 | **11,662** | 6,555 | **7,570** | 8,735 | **115,330** | 106,355 |
| Employees | **1,369** | 1,746 | **1,368** | 1,744 | **1,368** | 872 | **1,368** | 872 | **5,473** | 5,234 |
| Suppliers | **1,149** | 1,983 | **1,267** | 1,850 | **936** | 756 | **1,972** | 939 | **5,324** | 5,528 |
| Depreciation and amortisation | **106** | 121 | **106** | 120 | **106** | 60 | **106** | 60 | **424** | 361 |
| Write-down of assets | **169** | 2,050 | **0** | 0 | **0** | 0 | **0** | 0 | **169** | 2,050 |
| **Total operating expenses** | **61,680** | 54,598 | **39,952** | 46,081 | **14,072** | 8,243 | **11,016** | 10,606 | **126,720** | 119,528 |
| **Funded by** | | | | | | | | | | |
| Revenues from Government | **21,988** | 15,950 | **13,895** | 13,609 | **4,355** | 2,398 | **2,827** | 3,785 | **43,065** | 35,742 |
| Interest | **2,897** | 3,391 | **1,830** | 2,893 | **574** | 510 | **372** | 805 | **5,673** | 7,599 |
| Industry contributions | **31,075** | 28,646 | **19,637** | 24,442 | **6,154** | 4,307 | **3,995** | 6,798 | **60,861** | 64,193 |
| Project Refunds | **634** | 338 | **491** | 649 | **327** | 150 | **81** | 101 | **1,533** | 1,238 |
| Royalties | **879** | 760 | **879** | 200 | **879** | 97 | **879** | 93 | **3,516** | 1,150 |
| Reversal of previous asset write-downs | **0** | 4 | **0** | 4 | **0** | 1 | **0** | 1 | **0** | 10 |
| Other | **122** | 22 | **122** | 22 | **122** | 11 | **122** | 14 | **488** | 69 |
| **Total operating revenues** | **57,595** | 49,111 | **36,854** | 41,819 | **12,411** | 7,474 | **8,276** | 11,597 | **115,136** | 110,001 |

The Corporation's outcomes and outputs are described at Note 18A.

The Corporation uses actual expenses for the allocation of Research and Development expenses and some supplier expenses. All other expenses are apportioned across outputs evenly. Revenues uses actual income for allocation of project refunds, reversals of previous asset write-down and some other income. All other revenue is apportioned across outputs based on Research and Development expenditure.

## Note 19. **Joint Ventures**

During the year the Corporation was involved in the following operational joint ventures:

| Name of joint venture | Purpose | Participation |
|---|---|---|
| Enterprise Grains Australia | Enterprise Grains Australia is a national wheat breeding and commercialisation joint venture. | 39% |
| Graingene II joint venture | Graingene aims to generate innovative intellectual property and new generation plant biotechnology research for the grains industry. | 28.57% |
| Graingene III joint venture | Graingene aims to generate innovative intellectual property and new generation plant biotechnology research for the grains industry. | 33.33% |

# Appendices

APPENDIX 1

# Government research priorities (dollar and percentage values)

The following table summarises the expected total expenditure allocated against the Australian Government's National Research Priorities and priorities for rural R&D within the 2005-06 financial year. The allocation of funds is shown in both dollar and percentage terms for each output group.

## Expenditure on government research priorities, 2005–06

| National Research Priorities | *An environmentally sustainable Australia* | | *Promoting and maintaining good health* | | | | | | *Frontier technologies for building and transforming Australian industries* | | | | *Safeguarding Australia* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Ministerial priorities for rural R&D corporations and companies** | *Sustainable natural resource management* | | *Improving competitiveness through a whole-of-industry approach* | | *Maintaining and improving confidence in the integrity of Australian agricultural, food, fish and forestry products* | | *Improved trade and market access* | | *Use of frontier technologies* | | *Creating an innovative culture* | | *Protecting Australia from invasive diseases and pests* | | | |
| **GRDC expenditure on government research priorities** | | | | | | | | | | | | | | | **Grand total** | |
| | **$m** | **%** | **$m** | **%** | **$m** | **%** | **$m** | **%** | **$m** | **%** | **$m** | **%** | **$m** | **%** | **$m** | **%** |
| **Total** | 23.71 | 21.18 | 44.49 | 39.75 | 1.67 | 1.49 | 0.94 | 0.84 | 14.65 | 13.09 | 8.43 | 7.53 | 18.03 | 16.11 | 111.92 | 100 |
| **Output group expenditure on government research priorities** | | | | | | | | | | | | | | | | |
| | **$m** | **%** | **$m** | **%** | **$m** | **%** | **$m** | **%** | **$m** | **%** | **$m** | **%** | **$m** | **%** | **$m** | **%** |
| Varieties | 0.00 | 0.00 | 33.98 | 61.67 | 0.95 | 1.72 | 0.03 | 0.05 | 14.60 | 26.50 | 0.00 | 0.00 | 5.54 | 10.05 | 55.10 | 100 |
| Practices | 23.35 | 63.61 | 0.92 | 2.51 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.14 | 0.99 | 2.70 | 11.40 | 31.05 | 36.71 | 100 |
| New Products | 0.00 | 0.00 | 8.76 | 78.35 | 0.54 | 4.83 | 0.91 | 8.14 | 0.00 | 0.00 | 0.00 | 0.00 | 0.97 | 8.68 | 11.18 | 100 |
| CCS | 0.36 | 4.03 | 0.83 | 9.29 | 0.18 | 2.02 | 0.00 | 0.00 | 0.00 | 0.00 | 7.44 | 83.31 | 0.12 | 1.34 | 8.93 | 100 |

CCS = Communication and Customer Services

Note: Grand total does not include investments in the Global Crop Diversity Trust, Single Vision Grains Australia and emerging issues

APPENDIX 2

# GRDC project list

**Project expenditure, 2005–06**

| Project no. | Project title | Expenditure $ |
|---|---|---|
| | **GENE DISCOVERY** | |
| ACP00001 | Australian Centre for Plant Functional Genomics | 2,000,000 |
| AGP00006 | AWCMMP—Component: Wheat marker implementation/validation for Australian grain technologies | 257,000 |
| CAS00001 | ACAS—Australian Crop Accreditation System Ltd | 550,313 |
| CIM00007 | CIMMYT Alliance | 30,000 |
| CMB00005 | AWCMMP component project: Genetic analysis and marker-trait linkages—South and West | 412,000 |
| CMB00012 | AWCMMP curation of wheat and barley maps | 50,000 |
| CMB00013 | AWCMMP—Wheat Genome Sequencing Consortium | 147,972 |
| CSE193 | Grain Protection Genes | 2,000,000 |
| CSP00017 | Australian Cereal Rust Control Program—Molecular Discovery | 556,318 |
| CSP00061 | Analysis of the regulation of plant defence/stress gene expression | 131,465 |
| CSP00063 | AWCCMP Phase 2 project: Towards the application of perfect markers for broad spectrum disease resistance in wheat | 140,000 |
| CSP00078 | Genetic Basis of Sponge and Dough Breadmaking | 305,682 |
| CSPS10 | Project Review 2005—Grain Protection Genes | 15,432 |
| CWQ00010 | Triticarte | 150,000 |
| CWQ00013 | AWCMMP component project:—Phenotyping complex quality traits for marker identification and validation: Phase 2 | 96,641 |
| DAN00072 | AWCCMP—Component: Implementation/Validation of Molecular Markers in EGA | 357,995 |
| DAN00073 | National Statistics Project (KP1)—Statistical support for crop improvement and National Variety Trials | 393,893 |
| DAN00074 | National Statistics Project (KP2)—Strategic statistical research for crop improvement | 325,581 |
| DAQ00076 | Integrating crop improvement technologies for rapid genetic advance | 455,815 |
| DAQ00077 | AWCMMP component: Pedigree-based genome mapping for marker assisted selection and recurrent parent recovery in wheat and barley; Phase II | 180,000 |
| DAQ00078 | Molecular biology support for barley improvement—North | 101,000 |
| DAR00001 | Strategic investment in the development of Diversity Arrays Technology | 407,448 |
| DAR00002 | AWCMMP component project—Adding value to Diversity Arrays Technology | 75,000 |
| DAV00058 | Australian participation in the multinational Brassica Genome Project | 250,010 |
| DAV479 | Canola Molecular Marker Proposal | 394,900 |
| DAW00102 | Development and implementation of molecular markers for lupin breeding | 161,968 |
| DAW00113 | AWCMMP—Component: Validation/Implementation—Barley, Western Region | 139,000 |
| DAW00118 | AWCMMP—Component: Implementation/Validation of Molecular Marker DAFWA | 156,000 |
| GBA00003 | Development of salt-tolerant wheat for commercial production | 400,000 |
| ICA1 | Technologies for the targeted exploitation of the N I Vavilov Institute of Plant Industry (VIR), ICARDA and Australian bread wheat landrace germplasm for the benefit of the wheat-breeding programs of the partners | 154,500 |
| PBS00002 | Hybrid Cereal Technologies—Consultancy | 21,000 |
| UA00007 | Transformation in Functional Genomics and Cereal Improvement Programs | 382,454 |
| UA00063 | Breeding for frost tolerance in barley | 128,052 |
| UA00070 | Advancement of new genes for stem and leaf rust resistance from uncultivated relatives of wheat | 159,451 |

| Project no. | Project title | Expenditure $ |
|---|---|---|
| UA00072 | AWCMMP component project—Multiplex PCR technologies to accelerate the use of CCRs in cereal breeding and genetic research | 135,661 |
| UA00073 | Genetic variation for improved frost tolerance in wheat | 206,000 |
| UA00078 | AWCMMP—Component: Malting Barley Quality Improvement Program implementation and validation | 257,000 |
| UA00080 | AWCMMP component—Association Mapping | 267,038 |
| UA00083 | Cereal Functional Genomics Centre | 1,200,104 |
| UA00086 | Whole genome selection in wheat and barley—The practical application of whole genome analysis | 180,000 |
| ULA00006 | A novel male sterility system for canola and wheat | 138,300 |
| UMU00019 | AWCMMP component project—Rice–wheat–barley comparative genomics for key agronomic traits | 103,000 |
| US00030 | AWCMMP Phase 2 Component project—Markers for rust resistance in cereals | 100,260 |
| USQ00007 | AWCMMP—Component: Molecular markers for high priority traits in winter cereals for the northern region | 432,000 |
| VR24 | National Variety Trials | 4,433,112 |
| VR52 | Commercialisation Costs | 49,819 |
| VR55 | National Genetic Resource Centre Interim Executive Coordinator | (80,000) |
| WCI27 | Curation and management of genetic resources for the Australian grains industry | 1,206 |
| | **Total gene discovery** | **18,910,390** |
| | **GERMPLASM ENHANCEMENT** | |
| AGS00002 | CIMMYT Suite of Projects—Germplasm Evaluation project | 37,900 |
| AWB00005 | Australian Wheat Quality Improvement Program—Product and Market Knowledge | 70,000 |
| BBM00001 | Pilot brewing evaluation for malting barley lines destined for export | 54,600 |
| BRI00006 | National Wheat Quality Evaluation Program | 218,000 |
| BRI00028 | Australian Wheat Quality Improvement Program—Wheat Quality Laboratory Network | 225,900 |
| BRI102 | Grain Industries Centre for NIR: coordination and support activities | 80,000 |
| CIM00008 | CIMMYT Alliance—Component 1 Protecting the Australian wheat industry from Karnal bunt through the development and implementation of molecular markers | 150,000 |
| CIM00009 | CIMMYT Alliance—Component 2 Enhancement of stress tolerance in wheat through the expanded development and use of synthetic wheat and other alien introgressions | 150,000 |
| CIM00010 | CIMMYT Alliance—Component 3 Improving the stress tolerance of wheat genotypes of relevance to the Australian production environment | 302,000 |
| CIM00011 | CIMMYT Alliance—Component 4 Root diseases | 100,000 |
| CIM00012 | Enhancing Germplasm and Information Flow between CIMMYT and Australian Wheat Breeders | 87,628 |
| CIM13 | Australian Cereal Rust Control Program—Adult plant resistance and introgression of new and novel genes | 366,000 |
| CMB00003 | Variation in barley scald and effective resistance gene deployment | 132,000 |
| CMB00006 | MPBCRC: Improved disease resistance in cereals | 153,613 |
| CMB00007 | MPBCRC: Association mapping | 80,134 |
| CMB00008 | MPBCRC: New markers, genetic mapping and QTL analysis | 130,744 |
| CMB00009 | MPBCRC: Disease genetics—Pathogen variation and host interactions | 102,078 |
| CMB00010 | MPBCRC: Germplasm wheat quality—genetic ideotype for pre-harvest sprouting tolerance | 115,713 |
| CMB00011 | MPBCRC: Education and training program | 169,704 |

| Project no. | Project title | Expenditure $ |
|---|---|---|
| CSP00012 | New disease protection for wheat—a block of genes for resistance to barley yellow dwarf virus, root lesion nematode and rusts plus potential yield boost | 40,649 |
| CSP00018 | Wheat Germplasm with Improved Yield Performance under Drought for Australian Breeding Programs | 214,020 |
| CSP00053 | Wheat traits, genes and germplasm for adaptation to water-limited environments in the northern region | 839,110 |
| CSP00057 | Vigorous roots for hostile soils | 89,530 |
| CSP00058 | Development and delivery of salt tolerance and water use efficiency traits for durum with diversified genetic background | 250,962 |
| CSP00059 | Improved wheat and barley germplasm for saline and sodic soils: a collaborative project from CSIRO and Department of Primary Industries Horsham | 119,000 |
| CSP00068 | International Adaptation Trial: Investigating adaptation of Australian and CIMMYT wheat germplasm | 44,378 |
| CSP00071 | New resources for breeding for heading date and improved frost tolerance | 92,664 |
| CSP00076 | International Adaptation Trial: Investigating adaptation of Australian and CIMMYT wheat germplasm | 28,034 |
| CSP00077 | CSIRO–Pre-breeding Gateway: Germplasm development and validation of novel traits for Australian wheat breeding | 42,613 |
| CSP00080 | Novel strategies for manipulating dormancy in wheat | 301,478 |
| CSP00081 | Better wheats for Australia by capturing novel traits and associated markers for breeding programs | 62,094 |
| CSP00083 | New approaches and technologies for management of wheat grain protein content | 125,000 |
| CWQ00014 | Late Maturity Alpha-amylase Screening Services | 50,000 |
| DAN00061 | Durum Industry Development—Fast tracking genetic solutions to crown rot | 159,994 |
| DAN00064 | Durum Industry Development—Collaboration with ICARDA to accelerate cultivar improvement for adaptation across all production regions | 60,000 |
| DAN00084 | Consultancy Agreement—Costing of breeding programs | 9,488 |
| DAN00085 | National Statistics Project (KP3)—Molecular markers and statistical genetics | 201,736 |
| DAQ00002 | Novel Approaches to In-head Frost Tolerance | 55,240 |
| DAQ00045 | SIP04 Defect Elimination in Wheat | 125,603 |
| DAQ00094 | National Screening for Barley Grains Defects including Black Point, Staining and Pre-harvest Sprouting | 133,464 |
| DAQ00104 | Sponge and dough bread quality of Australian wheat germplasm | 241,145 |
| DAQ566 | Genetic approaches to resistance to *Fusarium* and *Bipolaris* in wheat and barley | 136,981 |
| DAS00031 | Incorporating new sources of stem and leaf rust resistance from wild oat species into cultivated oat varieties | 99,818 |
| DAS00039 | Improved oat varieties for milling, feed and hay/feed end use in the southern region Oat Breeding Program | 690,636 |
| DAS00048 | Control of cereal fungal diseases | 200,000 |
| DAS00052 | Plant Genetic Resources: Enhancing Germplasm Conservation for Australian Agriculture | 1,144,000 |
| DAV00076 | Synthetic Evaluation Project | 309,613 |
| DAV436 | Development of pre-harvest sprouting resistant breadwheats using resistances from *Triticum tauchii* | 35,000 |
| DAW00085 | Addressing rust resistance and other key traits in wheat breeding for the western region | 763,733 |
| DAW00126 | Enhancing resistance to *Stagonospora nodorum* in Australian wheat germplasm | 190,265 |
| GRD151 | Value Added Wheat CRC | 750,000 |
| JHC00001 | Study in the area of crop plant improvement by induced mutagenesis | 15,000 |

| Project no. | Project title | Expenditure $ |
|---|---|---|
| PBS00004 | Consultancy Agreement—Chair the Steering Committee of the Australian Genetic Resources Centres | 20,000 |
| UA00003 | Identification of resistance mechanisms to barley black point and effects of black point on malting quality | 38,500 |
| UA00014 | Improving stability of xanthophyll pigments and noodle colour via reduction in wheat grain lipoxygenase activity | 40,000 |
| UA00034 | SIP04 Defect Elimination in Wheat | 120,576 |
| UA00039 | SIP04 Defect Elimination in Wheat | 10,936 |
| UA00061 | Development and evaluation of weed competitive wheat cultivars | 247,500 |
| UA00074 | Germplasm development for durum improvement in southern Australia | 216,414 |
| UA00076 | Improving adaptation of wheat to hostile soils: quantifying the importance of traits and targeted germplasm development | 103,000 |
| UA00077 | Characterisation and recombination of wheat grain components that determine colour and colour stability in Asian noodles | 108,147 |
| UA00085 | SIP04 Defect elimination in wheat—Late maturity alpha-amylase | 188,348 |
| UA00090 | Physiological based screening for identifying novel salt-tolerant germplasm in wheat and barley | 92,231 |
| UA538 | Relocation of wheat biochemistry research program currently at the Plant Breeding Institute, Narrabri, to the University of Adelaide | 146,115 |
| UM00021 | Monitoring populations of the blackleg fungus to develop strategies for deployment of resistance genes in oilseed brassicas | 105,300 |
| UQ127 | Assessment of the extent of collateral damage in genetically-engineered wheat and barley | (18,975) |
| UQ157 | Enhanced evaluation of CIMMYT germplasm for Australia (Continuation)—Australian component | 75,000 |
| US00026 | The cell biology of cold-induced male sterility in wheat | 108,388 |
| US315 | Australian Cereal Rust Control Program | 1,017,508 |
| USQ00002 | Evaluation of Transgenic Wheats for Frost Tolerance | 114,070 |
| USQ00008 | Durum Industry Development—Molecular marker assisted selection for crown rot resistance | 60,000 |
| UT8 | Australia–China collaboration on barley genetic resources | 109,023 |
| UWA00038 | Genetic Dissection of Fungal Disease Resistance in Legumes using *Medicago truncatula* | 478,871 |
| UWA398 | Development of a salt-tolerant cereal using 'wide crosses' of wheat with 'wild' *Hordeum* species—CRC Salinity | 161,903 |
| VR03-1 | Australian Wheat Quality Improvement Program | 21,452 |
| VR05 | Wheat quality for Asian markets | 3,046 |
| VR05-1 | Wheat quality for Asian markets | 1,922 |
| VR08 | Importation and evaluation of CIMMYT germplasm | 5,175 |
| VR26 | BIOS Initiative | 672 |
| VR55-1 | National Genetic Resources Centre Interim Executive Coordinator | 3,103 |
| WCI52 | AWCMMP Communications Project | 101,652 |
| | **Total germplasm enhancement** | **14,027,138** |
| | **WHEAT AND BARLEY BREEDING** | |
| AAC00002 | Agriculture Australia Conference 2006—50% bronze sponsorship | 1,818 |
| AGL00004 | Consultancy Agreement—Best Practices for Breeding | 55,183 |
| AGP00004 | Fast-tracking of rust-resistant Stylet replacements for growers in Southern Australia | 242,967 |
| AGP00005 | National Triticale Improvement Program | 409,050 |

| Project no. | Project title | Expenditure $ |
|---|---|---|
| AGP00007 | Consultancy Agreement—Coordinator(s)—Barley Breeding Australia and National Pulse Breeding Program | 21,413 |
| AGP2 | Australian Grain Technologies—Independent Directors | 113,420 |
| ANU00007 | Managing and identifying resistance against barley scald | 109,966 |
| ANU00008 | Genetic controls of root impedance and drought signalling in wheat | 252,341 |
| BBE00003 | Consultancy Agreement—End Point Royalty Collection Models | 21,961 |
| CSP00019 | Wheat Breeding for the HRZs of Australia | 339,591 |
| CSPS11 | Project Review 2005—Wheat Breeding for the HRZs of Australia | 3,083 |
| CSPS8 | Project Review 2005—Wheat Quality Improvement | 22,149 |
| CWQ00011 | Dual-purpose Triticale Improvement Program—US | 82,214 |
| CWQ00015 | CIMMYT Communication Project | 63,000 |
| CWQ00016 | Exploiting *Septoria* resistance in wheat | 164,996 |
| DAN00055 | Barley improvement and quality program for south-eastern Australia | 160,000 |
| DAN00060 | Australian Durum Industry Development Officer | 119,065 |
| DAN00089 | Quarantine CIMMYT Bread Wheat Germplasm | 94,875 |
| DAQ00032 | SIP01 Barley improvement and industry development | 20,000 |
| DAQ00038 | SIP01 Barley improvement and industry development | 984,000 |
| DAV00025 | SIP01 Barley improvement and industry development | 607,694 |
| DAW00119 | Barley Breeding in the West | 1,356,838 |
| DAW00145 | Wheat Breeding Business Plan | 12,500 |
| EGA00001 | Enterprise Grains Australia | 3,819,895 |
| EGC00002 | Investment in Export Grains Centre Second Five-year Term | 2,000,000 |
| ICA00002 | Travel Award—to visit Australia | 6,000 |
| MPC00001 | Project Review 2005—Wheat Quality Improvement | 8,000 |
| MPC00002 | Coordinator for Barley Breeding Australia | 45,500 |
| PBS00001 | Consultancy Agreement—Best practices for breeding | 509 |
| RWF00004 | National Approach to Wheat Quality Research for Variety Development | 50,000 |
| RWF00005 | Report on the key terms and activities required for a wheat-breeding alliance between EGAII and Longreach Plant Breeders | 14,351 |
| SPS2 | SunPrime Pty Ltd—Independent Directors | 7,247 |
| TMP164 | Wheat Breeding—National | 15,473 |
| UA00032 | SIP01 Barley improvement and industry development | 1,309,964 |
| UQ00040 | Support for ICIS (International Crop Information System) for Australian grain breeding and CIMMYT germplasm introduction programs | 46,111 |
| UWA00096 | Barley Improvement through germplasm introduction, evaluation and enhancement | 145,729 |
| VR01 | Barley Breeding | 6,896 |
| VR01-1 | Barley Breeding | 14,141 |
| VR01-2 | Barley Breeding | 30,000 |
| | **Total wheat and barley breeding** | **12,777,941** |
| | **PULSE AND OILSEED BREEDING** | |
| ACA5 | Contribution to ACIAR project—CS1/1999/072 Oilseed Brassica Improvement in China, India and Australia | 175,000 |
| AOF00003 | Taskforce of Adventitious Presence of GM Canola | 20,000 |
| AOF00005 | Canola Quality Objectives Group | 15,000 |
| CI29 | Lupin (narrow-leafed lupin) breeding—capital component | 65,000 |

| Project no. | Project title | Expenditure $ |
|---|---|---|
| COL00001 | Assessing the direction and potential of the soybean industry in Australia—Consultancy Agreement | 10,176 |
| CSP338 | National soybean improvement | 1,054,372 |
| DAN00034 | Northern Faba Bean Improvement Program | 358,092 |
| DAN00052 | Development of chickpea genotypes and improved agronomic practices for chickpea, faba bean and mungbean in northern New South Wales | 119,917 |
| DAN00053 | Canola and mustard in northern New South Wales | 137,927 |
| DAN00062 | Albus Lupin Breeding | 284,864 |
| DAN00063 | National Brassica Improvement Program—Component 2, Stage 3: New South Wales Agriculture | 270,000 |
| DAN00065 | Northern Desi Chickpea breeding program | 248,456 |
| DAN00090 | A pilot project on control of Bean leafroll virus on faba bean in the northern region | 25,000 |
| DAN00094 | Australian Chickpea Breeding Program | 557,688 |
| DAN00096 | Canola and mustard in northern New South Wales (II) | 123,630 |
| DAQ00015 | Crop Improvement of Grain Sorghum in Australia—Core Breeding | 562,061 |
| DAQ00060 | National Mungbean Improvement Program | 228,938 |
| DAQ00062 | Cloning of an Insect Resistance Gene from Sorghum | 117,346 |
| DAQ00070 | Australian Peanut Improvement Program | 460,000 |
| DAQ00073 | Implementing technologies and strategies to maintain resistance to sunflower rust | 182,450 |
| DAQ00085 | Identifying Candidate Genes for Stay-green in Sorghum | 148,090 |
| DAQ00092 | Maize germplasm enhancement and productivity improvement for tropical Australia | 139,755 |
| DAS00047 | National Brassica Improvement Project—South Australia Component | 59,300 |
| DAS00050 | Lupin evaluation—South Australia–Victoria node | 90,026 |
| DAS00059 | Improved vetch varieties for Australian farmers and end-users | 193,995 |
| DAV00060 | National Brassica Improvement Program—Department of Primary Industries Victoria and Lead Agency | 354,915 |
| DAS00066 | Pulse Germplasm Enhancement—Vegetative and reproductive frost tolerance in pulse crops | 38,179 |
| DAS00067 | Pulse Germplasm Enhancement—Bacterial blight in field pea, pod drop in lentil, and heat stress tolerance in field pea and faba bean | 54,805 |
| DAV00071 | Australian Field Pea Breeding Program | 365,166 |
| DAV00072 | Australian Lentil Breeding Program | 221,229 |
| DAV00073 | Pulse Germplasm Enhancement—Boron and salt tolerance in temperate pulses and durable ascochyta blight resistance in chickpea | 24,500 |
| DAV451 | Coordinated improvement of chickpea in Australia—south-east region | 194,017 |
| DAW00101 | Evaluation and selection of high-quality brassica breeding lines for short-season environments of Western Australia | 149,804 |
| DAW00104 | Yellow lupin improvement | 319,138 |
| DAW00105 | Western Lupin Technology (Narrow-leafed lupin breeding for southern Australia) | 737,206 |
| DAW706 | Breeding of chickpea for the western region | 15,000 |
| DAW707 | Breeding field peas for the western region | 81,367 |
| GBE00001 | Consultancy Agreement—National Pulse Breeding Program | 83,000 |
| SGA00001 | Business Plan for the Australian Canola Industry | 6,247 |
| UA00079 | Faba Bean Breeding—Southern and Western Regions | 465,050 |
| UT00004 | Grain Legume and Oilseed Evaluation in Tasmania | 146,400 |
| UWA00009 | Improved lupin grain quality and yield through genetic manipulation of key physiological traits | 74,794 |

| Project no. | Project title | Expenditure $ |
|---|---|---|
| UWA00036 | An international collaboration to develop interspecific hybrids between chickpea and its wild annual relatives | 5,000 |
| UWA00091 | An international collaboration to develop interspecific hybrids between chickpea and its wild relatives | 61,565 |
| UWA00092 | Lupin germplasm characterisation | 220,000 |
| UWA00093 | Pearl Lupin—development of the first Australian cultivar for commercial evaluation | 49,488 |
| UWA00094 | Interspecific hybridisation of lupins | 71,780 |
| | **Total pulse and oilseed breeding** | **9,385,733** |
| | **TOTAL VARIETIES** | **55,101,201** |
| | **AGRONOMY AND SOILS** | |
| AAD00001 | Precision Agriculture Manual CD consultancy agreement | 41,500 |
| AGL00003 | Project Review 2005—Lucerne projects | 24,630 |
| AGO00002 | AGO contribution to DAW00103: Measurement of paddock-based greenhouse gas emissions from wheat production to improve lifecycle assessment of wheat products | (92,975) |
| AWR00002 | Contribution towards Pastures Australia | 150,000 |
| AWR00003 | Contribution towards National Annual Pasture Legume Improvement Program | 248,477 |
| BAT00001 | Consultancy Agreement—Enhancing profitability—a collaborative, diagnostic approach to cropping systems research | 4,125 |
| BWD00008 | Flexible farming systems to meet the challenges of farming the southern Mallee and northern Wimmera | 136,000 |
| CAG00002 | On-farm Evaluation of Frost Minimisation Techniques and Risk Management Strategies | 50,000 |
| CCC00001 | High-yielding irrigated grains in cotton systems—Phase 1—A review and scoping study | 48,000 |
| CCC00002 | Quantifying effects of maize rotation on soil quality and nutrient availability on cotton growth and yield | 6,000 |
| CDS00001 | CRC for Plant-based Management of Dryland Salinity | 10,000 |
| CFG2 | Using precision agriculture and soil inoculants to improve crop performance and grower returns | 50,000 |
| CFI00008 | Precision Agriculture Initiative—Farming Systems Research Group (Northern Region) | 51,000 |
| CSA00007 | Province, paddock or patch? Giving farmers tools to optimise the scale at which fertiliser decisions are made | 112,000 |
| CSA00010 | Collation and analysis of data in the economics of precision agriculture—Precision Agriculture Manual | 25,000 |
| CSE00036 | Scoping study to review current research on microbe–plant interactions in the rhizosphere and identify priorities for future investment | 50,000 |
| CSO00004 | Objective measures for managing the risk of deep drainage | 53,046 |
| CSO00007 | Addressing the soil supply factor to improve prediction of plant nutrient requirements | 127,225 |
| CSO00016 | Integrated management of *Pythium* root disease complexes to improve sustainability and productivity of crop rotations (GRD145) | 9,850 |
| CSO00017 | SIP09 Precision Agriculture Initiative | 260,835 |
| CSO00028 | Management of soil microbial function for improved productivity in intensive cropping systems | 212,720 |
| CSO00029 | Residue management, soil organic carbon and crop performance | 200,896 |
| CSO00030 | Developing improved capacity to predict nitrogen supply to crops | 450,308 |
| CSO00031 | Innovative solutions to subsoil constraints for a profitable and environmentally sustainable grains industry in Western Australia | 108,030 |
| CSO00032 | Investigation of cause and extent of lodging and yield loss associated with stubble retention in irrigated maize | 110,061 |

| Project no. | Project title | Expenditure $ |
|---|---|---|
| CSO00033 | Farming systems options and catchment salinity response | 199,241 |
| CSO00034 | Improving farm to catchment nutrient management for a more profitable and environmentally sustainable grains industry | 193,363 |
| CSO00036 | Scoping study to review current research on microbe–plant interactions in the rhizosphere and identify priorities for future investment | (50,000) |
| CSO00038 | Feasibility for rapid soil measurement using core scanning | 36,842 |
| CSO231 | Fluid fertilisers—the next step towards raising yield potentials | 349,959 |
| CSO232 | Managing the fallow period for optimum water use and nitrogen availability | 106,614 |
| CSP00015 | Improving wheat yields and quality in Western Australian sandplain farming systems | 211,482 |
| CSP00040 | Can we forecast seasonal wheat grain yields and protein in Western Australia? | 32,785 |
| CSP00049 | Evaluating the use of subsoil water by crops—is it the pipes or the pump? | 155,106 |
| CSP00064 | Exploiting genetic variation in wheat roots to promote beneficial interactions with soil organisms and thereby increase yield | 193,348 |
| CSP00065 | Delivering high yields of milling wheats in the HRZ of Western Australia | 149,027 |
| CSP318 | Citrate-secreting break crops to unlock the fixed-P bank in rotations | 71,059 |
| CSP343 | Identifying and evaluating 'primer crops' for hostile subsoils | 66,055 |
| CTF00002 | SIP09 Precision Agriculture Initiative | 182,500 |
| CWF00005 | Combating subsoil constraints | 71,220 |
| DAN00002 | Permanent beds for sustainable farming on irrigated farms | 40,389 |
| DAN00028 | SIP01 Barley improvement and industry development | 231,000 |
| DAN00054 | SIP09 Precision Agriculture Initiative | 111,498 |
| DAN00059 | Direct and indirect measurement of deep drainage in north-west New South Wales cracking clays: is there more drainage in cropping systems if lucerne is included? | 153,470 |
| DAN484 | Breeding improved lucernes for cropping systems in eastern Australia—Phase II | 244,738 |
| DAQ00048 | Identification of soil biotic constraints in contrasting farming systems on Vertosols of the northern grains region | 282,332 |
| DAQ00061 | Agronomic Solutions for Queensland Pulse Growers | 174,053 |
| DAQ00067 | SIP09 Precision Agriculture Initiative—Eye in the sky to revolutionise northern crop production | 139,380 |
| DAQ00084 | Nutrient management in rainfed cropping systems of the northern grains region | 283,113 |
| DAS00017 | Reducing the impact of climate variability (funding supplemented with NEGSFS15) | 115,959 |
| DAS00035 | Managing Diseases using Precision Agriculture | 153,193 |
| DAS00040 | The seed increase and distribution of perennial legumes to support sustainable and productive farming systems | 60,000 |
| DAS347 | Breeding lucerne for Southern Australian cropping districts | 293,420 |
| DAV00006 | Tools to reduce the impact of climate variability in south-eastern Australia | 195,060 |
| DAV00022 | Maintaining the Productivity of Soils Under Continuous Intensive Cropping | 121,943 |
| DAV00030 | SIP09 Precision Agriculture Initiative | 165,404 |
| DAV00049 | Improving the profitability of cropping on hostile subsoils | 519,324 |
| DAV00056 | Understanding subsoil constraints in the HRZ | 53,257 |
| DAV00057 | Pulse agronomic research for the development of variety-specific management packages in south-eastern Australia | 170,029 |
| DAV00059 | Management of high-rainfall cropping to improve water quality and productivity | 205,621 |
| DAV00061 | Genotype and management combinations for highly productive cropping systems in the HRZ | 490,712 |
| DAV00066 | Delivering rapid soil tests to growers | 150,380 |

| Project no. | Project title | Expenditure $ |
|---|---|---|
| DAV417 | Environmental impacts of raised-bed cropping systems in south-west Victoria | 91,152 |
| DAW00012 | Variety-specific agronomy for wheat yield and quality in the western region | 668,356 |
| DAW00031 | Evaluation and cultivar selection for herbicide tolerance in annual legume pastures | 127,692 |
| DAW00032 | Improving weed management with biserrula in the pasture phase of Western Australian cropping systems | 139,969 |
| DAW00075 | Interaction of nitrogen with other nutrient elements for production of canola grain and oil | 72,500 |
| DAW00084 | Diagnostic support and training for precision agriculture | 120,722 |
| DAW00087 | Better long-lead seasonal and crop forecasts for southern Australia | 137,793 |
| DAW00088 | Climate change, wheat yield and cropping risks in Western Australia | 126,284 |
| DAW00093 | Identifying soil constraints to crop production on the south coast sandplain | 121,200 |
| DAW00099 | Lupin agronomic improvement in the western region—Enhancing the profitability of the lupin–wheat rotation | 290,239 |
| DAW00103 | Measurement of paddock-based greenhouse gas emissions from wheat production to improve life cycle assessment of wheat products | 103,922 |
| DAW00107 | Oat agronomy and industry development for the western region | 123,600 |
| DAW00130 | Using precision agriculture tools to design and manage profitable mallee agroforestry systems: a preliminary assessment of the technology | 10,000 |
| DAW00138 | The use and impact of deep drains on improving salt-affected soils used for grain cropping in the Western Australian wheat belt | 80,000 |
| DAW717 | Soil and surface water management for profitable crops and pastures on waterlogged and saline land | 140,000 |
| DAW723 | Coordinator for the National Annual Pasture Legume Improvement Program | 4,350 |
| DNR00004 | SIP08 Combating subsoil constraints | 361,613 |
| DNR00006 | Which northern dryland farming systems are at high risk of deep drainage and salinity? | 154,516 |
| GRD200 | Agronomy Reference Group—Western Panel | 6,510 |
| LWR25 | GRDC contribution towards Managing Climate Variability Program | 698,518 |
| MCP00002 | Refinement of best management practices for chickpeas and mungbean in north-western farming systems | 2,502 |
| MLA00001 | GRDC contribution to Pasture Soil Biology Program | 100,000 |
| NEGSFS2 | SIP09 Precision Agriculture Initiative | 5,000 |
| NMS00002 | Adoption of improved nutrient management practices | 155,000 |
| PR41-1 | Delivering rapid soil tests to growers | 2,807 |
| PR96 | Commercialisation costs | 55,000 |
| SFP23 | National Rhizobium Program Review | 500 |
| SFP8 | Precision Agriculture Initiative (SIP09)—Administrative Costs | 5,393 |
| SFP9 | Precision Agriculture Supplement for *Ground Cover* | 14,545 |
| SFX00002 | Support for SIP09 initiative and testing of stability zones and pseudo harvest index measures across core sites | 67,000 |
| SPA00003 | Improvement of nutrient management through effective use of precision agriculture technologies in the southern Australian grains industry | 79,500 |
| UA00023 | Improving farming systems for the management of transient salinity and risk assessment in relation to seasonal changes in southern Australia | 167,193 |
| UA00081 | Determining the benefits of fluid fertilisers on neutral and acidic soils in eastern and western Australia | 79,621 |
| UCS00003 | Sequencing crop rotations that best utilise lucerne biopores to control groundwater recharge and maintain dry catchments | 18,074 |
| UM00015 | Epidemiology and control of botrytis grey mould in lentils | 50,474 |

| Project no. | Project title | Expenditure $ |
|---|---|---|
| UM00023 | Synchronising nutrient supply and crop demand in modern cropping systems | 323,010 |
| UNE00009 | Chair in Sustainable Grain and Grazing Farming Systems | 82,530 |
| UNS00002 | Active Implements for Precision Seed and Fertiliser Placement | 50,000 |
| UQ00037 | Improved performance of cereal roots in Australian farming systems—matching roots to cropping systems in the northern cropping region | 137,000 |
| UQ163 | Pathology support for lucerne improvement including germplasm enhancement | 218,606 |
| US00017 | SIP09 Precision Agriculture Initiative | 189,644 |
| US00033 | Development of a multi-sensor platform for real-time collection of field soil data | 75,000 |
| UT00009 | Delivering a world-class root model to Australian grains researchers | 75,775 |
| UWA00005 | Improving the utilisation of pasture germplasm by the development of a core collection using ecogeographical and molecular techniques | 45,000 |
| UWA00031 | Optimising potassium cycling in soils and crops for improved grain production in Western Australia | 105,000 |
| UWA00081 | Combating subsoil constraints: Unlocking crop potential through innovative subsoil management | 509,257 |
| UWA00083 | Lectureship in Pasture Science at UWA | 40,012 |
| UWA00084 | Profitable and sustainable nutrient management in the Western Australian grain industry | 255,000 |
| UWA00089 | Delivering rapid soil tests to growers | 149,918 |
| UWA00090 | Root Systems for Australian Soils: Root traits for hardpan penetration and water extraction in wheat | 118,080 |
| UWA00104 | Prospects for Perennial Wheat | 50,000 |
| UWA396 | High water-use farming systems that integrate crops with perennial pastures—CRC Salinity | 88,097 |
| UWA397 | National field evaluation and selection of new pasture plants from the salinity CRC to improve hydrologic stability of farming systems—CRC Salinity | 500,000 |
| UWA400 | Capacity building in Crop Agronomy | 143,301 |
| UWS00007 | Improved management of nutrient and soil water interactions in the northern grain zone | 122,410 |
| WWL00001 | Bringing it all together for the grains industry—a whole-of-catchment approach to integrated water management | 186,653 |
| | **Total agronomy and soils** | **16,615,442** |
| | **CROP PROTECTION** | |
| ACR00002 | Extending the outcome of ACR4 | 23,000 |
| AGL00005 | Project Review 2005—Australian Cereal Rust Control Program | 35,000 |
| AKC00001 | Registration for minor use chemicals for the grains industry | 123,000 |
| ANU00002 | Lectureship in Plant–Microbe Interactions | 53,016 |
| ANU00006 | Exploring a model system to develop controls for plant parasitic nematodes | 99,932 |
| BWD00005 | Improved techniques for managing herbicide-resistant ryegrass | 188,750 |
| CRW5 | CRC for Weeds | 750,000 |
| CSE00027 | Insecticide resistance and sustainable management of aphids | 123,900 |
| CSE00028 | Natural enemy evaluation of the silverleaf whitefly and ecological processes affecting silverleaf whitefly dispersal | 163,500 |
| CSE00029 | National Pest Initiative | 424,934 |
| CSE00037 | Curation and development of invertebrate collections within the Australian National Insect Collection | 83,800 |
| CSE00038 | The application of novel genetic approaches to pest land snails—a feasibility study | 20,500 |
| CSP00007 | Molecular relationships in the rust fungi particularly the family Pucciniaceae | 41,275 |

| Project no. | Project title | Expenditure $ |
|---|---|---|
| CSP00079 | Non-race specific (broad spectrum) adult plant rust resistance in wheat | 260,332 |
| CSV00002 | Biological control of mice—Immunocontraception | 351,284 |
| DAN00066 | More profitable chickpeas through disease management—northern region | 100,000 |
| DAN00067 | Differential herbicide tolerance of winter crops in south-east Australia—Stage 2 | 142,800 |
| DAN00068 | Integrated disease management in field crops with emphasis on sclerotinia stem rot in canola | 123,300 |
| DAN00079 | Risk assessment and preventative strategies for herbicide resistance in the northern region (Phase II) | 200,000 |
| DAN00086 | Assessment of IPM strategies to control insects in rotational farming systems of the southern region | 24,325 |
| DAN00095 | *Helicoverpa* spp. insecticide resistance—monitoring, mechanisms and management | 93,085 |
| DAN485 | Management of *Fusarium* diseases and common root rot of cereals in the northern cropping zone | 277,148 |
| DAQ00027 | Screening for differential herbicide tolerance in cultivars of winter cereals in the northern region | 72,000 |
| DAQ00056 | Development of an area-wide decision support system for whitefly management in central Queensland cropping systems | (57,733) |
| DAQ00059 | Minimising the impact of pulse diseases in Queensland | 132,426 |
| DAQ00064 | Delivering applied solutions to weed issues in central Queensland | 105,442 |
| DAQ00065 | Cropping option to limit root lesion nematodes | 109,708 |
| DAQ00074 | Facilitating adoption of IPM in northern region broadacre farming systems | 150,000 |
| DAQ00079 | Modelling for sustainable glyphosate use in the northern region | 100,000 |
| DAQ00083 | Integration of biopesticides into IPM against sucking pests | 128,175 |
| DAQ00086 | IPM for pulses in northern Australia—Sustainable production in a changing cropping environment | 136,836 |
| DAQ00096 | Emerging foliar wheat disease issues in the northern region | 150,000 |
| DAQ00097 | Determining the cause, extent, impact and potential control measures for an unidentified disorder in sunflower crops in central Queensland | 79,018 |
| DAS00032 | Crown rot management in durum and bread wheats for the southern region | 163,449 |
| DAS00034 | Diagnostic Support to Crown Rot Strategic Initiative | 65,814 |
| DAS00041 | Pathology support for pulse crops in southern region—South Australian module | 95,400 |
| DAS00042 | Pathology support for annual pasture legumes | 86,663 |
| DAS00054 | Management of *Etiella* in lentils in southern Australia | 70,000 |
| DAV00048 | Victorian pulse pathology and virology support program | 116,600 |
| DAV00062 | Victorian cereal pathology support with emphasis on crown rot management | 236,912 |
| DAW00041 | Improving the management of diamondback moth (*Plutella xylostella*) in canola in the western region | 100,663 |
| DAW00106 | Managing disease constraints in western region farming systems | 1,125,000 |
| DAW00114 | Applied weed management in Western Australia | 245,000 |
| DAW00123 | A systems approach to enhance the adoption of IWM techniques in the Northern Agricultural Region of Western Australia | 202,932 |
| DAW00124 | Rotations to reduce impact of nematodes in western cereal cropping systems | 139,313 |
| DAW00127 | Crop pest management for farming systems in high-rainfall areas of southern Australia | 149,439 |
| DAW00131 | Management of annual ryegrass using deleterious rhizobacteria | 112,926 |
| DAW00132 | Improving the management of diamondback moth (*Plutella xylostella*) in canola in the western region: Phase 2 | 55,016 |
| DAW00134 | Evaluating herbicide tolerance with new crop varieties | 168,625 |

| Project no. | Project title | Expenditure $ |
|---|---|---|
| DAW00141 | Developing a sensitive dry seed test to detect seed-borne viruses in bulk seed samples of wheat | 85,782 |
| DNR00007 | Effective and safe rodent management in grain-cropping systems | 90,636 |
| GRD183 | RDCs contribution to Cooperative Research Centre for Plant Biosecurity: Scoping study | (5,000) |
| IPM00002 | Developing and demonstrating IPM in broadacre cropping | 110,500 |
| NPB00001 | Evolution of Russian wheat aphid virulence and resistance sustainability | 97,010 |
| NPB00002 | Enhancing the detection of *Tilletia indica*, the cause of Karnal bunt | 89,607 |
| NPB00003 | Contingency plans for emergency plant pests of the grain industry | 103,010 |
| PR97 | Project Review 2005—Western Australian Herbicide Resistance Initiative | 22,000 |
| PR98 | Project Review 2005—Grain Protection Genes | 15,568 |
| SFS00015 | Optimising cereal profitability in the HRZ through the integration of disease management and canopy management principles | 416,855 |
| UA00060 | Developing management systems for brome grass, a serious threat to production systems on fragile sandy textured soils in southern Australia | 158,986 |
| UA00071 | Control and eradication of a parasitic weed, field trials | 201,973 |
| UA00075 | Managing the risks of trifluralin resistance in no-till cropping systems | 118,328 |
| UA00088 | Understanding and management of weed resistance to glyphosate | 119,640 |
| UM00016 | Fungal pathology developments for management of diseases of oilseed brassicas in Australia | 130,835 |
| UM00020 | Strategies to ensure longevity of blackleg disease resistance genes in canola | 196,400 |
| UM00022 | Emerging mite pests in southern Australia | 122,080 |
| UMU00021 | *Medicago truncatula*—Australian Centre for Necrotrophic Fungal Pathogens—Disease Resistance | 50,000 |
| UMU00022 | *Stagonospora nodorum*—Australian Centre for Necrotrophic Fungal Pathogens | 426,575 |
| UNE62 | Field studies and management of crown rot in the northern region | 98,348 |
| UQ00029 | Population Genetics of Heliothis Migration, Recruitment and Origins | 132,538 |
| UQ00032 | Advanced application technology to manage spray drift and improve the efficacy of weed management practices | 105,000 |
| UQ00036 | *Trichogramma* incidence in grains and cotton growing regions of Australia—consequences for *Helicoverpa* management | 50,124 |
| UWA00041 | Biology of diamondback moth in Western Australia | 17,500 |
| UWA00073 | Economic analysis of GRDC investment in herbicide use | 54,979 |
| UWA00097 | Improved herbicide tolerance for pulses in the western region | 147,232 |
| UWA344 | Determination of histological and biochemical resistance mechanisms for the identification of molecular markers for blackleg resistance in oilseed brassicas | 42,500 |
| UWA399 | Western Australian Herbicide Resistance Initiative | 602,702 |
| | **Total crop protection** | **11,744,213** |
| | **VALIDATION AND ADOPTION** | |
| AGM00001 | Western Australia Agribusiness Trial Extension Network | 12,500 |
| AGN00005 | Southern Agribusiness Trial Extension Network—To develop, conduct and deliver key research trials and associated communication and extension activities | 25,000 |
| AGV00001 | Southern Agribusiness Trial Extension Network | 50,000 |
| BBC00001 | Project Review 2005—Eastern Farming Systems (Phase II), a partnership for participatory R&D extension in the north-eastern grain belt | 10,000 |
| BWD00006 | The 'REAL' project—Relevant, Experienced, Applied Learning | 222,925 |
| BWD17 | Southern Mallee and Northern Wimmera Farming Systems | 85,000 |
| CAA00003 | Growing western canola technology | 150,000 |

| Project no. | Project title | Expenditure $ |
|---|---|---|
| CFI00009 | Guiding growers to more profitable and sustainable cropping systems in the western districts of the northern grain belt | 150,000 |
| CSPS7 | Project Review 2005—Eastern Farming Systems (Phase II) a partnership for participatory R&D extension in the north-eastern grain belt | 171 |
| CWF00007 | Central West Farming Systems—Extension and Development | 305,000 |
| CWF00009 | Low-rainfall Collaboration | 200,000 |
| DAQ00049 | Sustainable farming systems for central Queensland | 715,143 |
| DAQ00050 | Enhancing system water-use efficiency in the north-eastern grain belt through participatory R&D extension (Eastern Farming Systems Phase II) | 546,347 |
| DAQ00063 | Viable and sustainable farming systems on Ferrosols | 193,042 |
| DAQ00091 | Tool Kit for Best Management Practices in Peanuts—development extension for rapid adoption of decision support using commercial industry networks | 122,030 |
| DAQ00103 | Validation and integration of new technology through grower groups in the south-west Queensland grain-growing zone—Western Farming System (Queensland) | 252,200 |
| DAS00003 | Developing annual medics tolerant to residues of sulfonylurea herbicides | 99,182 |
| DAS00038 | State Focus South Australia | 99,170 |
| DAT00003 | Enhancing TOPCROP and GRDC extension in Tasmania | 78,656 |
| DAV00045 | TOPCROP State Focus | 105,100 |
| DAV00053 | Evaluation Research: An innovative approach to assessing impact and building evaluation capability in farming systems groups | 173,184 |
| DAV437 | Novel farming systems to increase productivity and reduce risk in the Mallee | 67,792 |
| DAW00100 | Pulse Industry Extension—Expanding pulse cropping by targeted extension of improved varieties and management packages | 278,114 |
| DEL00001 | Agribusiness Trial Extension Network | 12,500 |
| FFC00001 | Western Region's Agribusiness Trial Extension Network project | 12,500 |
| FGI00002 | Western Australia Agribusiness Trial Extension Network | 12,300 |
| FLR00002 | FarmLink: Supporting the establishment of a new Farming Systems Groups for southern New South Wales | 272,076 |
| HBS00001 | Agribusiness Trial Extension Network | 12,500 |
| HFG00004 | Straight to the Hart—Profitable farming for the future | 100,000 |
| HOR00003 | Western Australia Agribusiness trial extension network | 12,500 |
| ICF00004 | Lifting irrigated cropping profitability and water use efficiency (Victoria) | 76,050 |
| ICF00005 | Lifting irrigated cropping profitability and water use efficiency (New South Wales) | 166,000 |
| IMA00001 | Agribusiness Trial Extension Network | 11,375 |
| JSA00001 | Agribusiness Trial Extension Network—Southern Region | 26,950 |
| JSR00001 | Southern Regions Agribusiness Trial Extension Network Project | 12,500 |
| LIE00003 | A sustainable dryland community achieved through proactive research on effective management of the soil resource | 121,310 |
| LRS00001 | Consultancy Agreement—Southern Agribusiness Trial Extension Network | 27,500 |
| LWR23 | GRDC contribution towards the Grain and Graze Program | 813,000 |
| MFM00002 | Increasing crop yields on Kangaroo Island and in the south-east of South Australia | 154,000 |
| MGP00001 | Consultancy Agreement—Conduct a review of current and past oilseed agronomy activities and technical reference materials | 15,000 |
| MSF00002 | Mallee Sustainable Farming Project | 488,462 |
| NFG00001 | Western regions Agribusiness Trial Extension Network project | 12,500 |
| NGA00001 | Validation and integration of new technology through grower groups in north-west New South Wales and south-west Queensland grain-growing zones | 206,750 |
| PAL00007 | Crop Support for the Northern and Southern Regions | 337,910 |

| Project no. | Project title | Expenditure $ |
|---|---|---|
| PLN00003 | Western Australia Agribusiness Trial Extension Project | 12,500 |
| PSD17 | Relationships with Agribusiness | 30,385 |
| PSD31 | Topactive | 25,000 |
| RAI00001 | Western Australia Agribusiness Trial Extension Network | 9,000 |
| RDP00003 | Southern Agribusiness Trial Extension Network | 24,960 |
| RPI00003 | Zonal Management in the Riverine Plains | 10,750 |
| RPI00006 | Improving Winter Cropping Systems in the Riverine Plains | 149,735 |
| RSS00001 | Farming Systems Improvement in the Upper North of South Australia | 110,000 |
| SAN00005 | Improving sustainable grain production through increased adoption of no-till farming | 74,500 |
| SFP06.1 | Grower Group Support | 39,243 |
| SFS00013 | Coordination of GRDC HRZ investment | 99,935 |
| SFS00014 | Investigating stubble management systems to reduce dependence on burning in the HRZ region of southern Australia | 188,900 |
| SFX00003 | Western regions Agribusiness Trial Extension Network | 12,500 |
| SYN00001 | Western Australian Agribusiness Trial Extension Network | 12,500 |
| SYP00005 | Development of best practice farming systems for medium-rainfall alkaline soils | 71,940 |
| UA00087 | Eyre Peninsula Farming Systems Project II | 500,673 |
| UFC0001 | Continued identification of and overcoming constraints to canola production on growers' paddocks | 32,160 |
| WAN00008 | Western Australian No-Tillage Farmers Association technology demonstration site | 100,000 |
| | **Total validation and adoption** | **8,348,920** |
| | **TOTAL PRACTICES** | **36,708,576** |
| | **NEW FARM PRODUCTS AND SERVICES** | |
| AGL00006 | On-farm Instrumentation Scoping Study | 106,950 |
| AGL00007 | Project Review 2005—Development of specific microbial and transgenic technology to control fungal pathogens: a commercialisation project based on patent application no. PP8394/99 | 5,000 |
| ANU19 | Development of specific microbial and transgenic technology to control fungal pathogens | 161,916 |
| AWR00004 | Contribution towards the National Rhizobium Program | (319,265) |
| BRI00027 | Objective grain quality testing | 898,914 |
| BRI00035 | Scoping study to evaluate a new baking process for Australian wheat in Asia | 96,700 |
| CSE00041 | Development of an integrated aeration–fumigation system | 110,810 |
| CSP00050 | Quantifying the effect of hydrogen gas on soil biota and crop performance | 245,086 |
| DAS00027 | Soil Biology R&D Initiative | 105,788 |
| DAS00036 | TRINOC™: Tri-inoculation for enhanced wheat growth under disease-limiting conditions | 126,457 |
| FS00001 | TRINOC™: Tri-inoculation for enhanced wheat growth under disease-limiting conditions | 17,000 |
| GRD174 | Strategy for Commercialisation of Soil Biology Research Outcomes and Future Negotiations for Biological Inputs for Profitable Farming | 3,375 |
| NP01 | Biological Inputs for Profitable Farming | 67,660 |
| NP14-1 | New baking process for Australian wheat in Asia | 1,747 |
| NP15 | Commercialisation Cost | 39,003 |
| PAL00009 | Objective measurement of pulse qualities | 175,000 |
| PBA00001 | Develop and market a range of inoculant products in Australia and the Asian regions designed to provide benefits to agricultural growers | 473,401 |

| Project no. | Project title | Expenditure $ |
|---|---|---|
| PBA00002 | Development and testing of new soil inoculants for the Australian grains industry | 500,000 |
| RJH00001 | National Output Development and Evaluation Project—Soil Biology Initiative | 481,890 |
| RO00001 | Project Review 2005—Development of specific microbial and transgenic technology to control fungal pathogens: a commercialisation project based on patent application no. PP8394/99 | 5,000 |
| UA00062 | Biological cycling of phosphorus in farming systems—towards an improved capacity for managing phosphorus supply to grain crops | 214,229 |
| UF00002 | Soil Biology R&D Initiative | 31,000 |
| UMU00003 | National Rhizobium Program—developing and delivering high-quality rhizobial inoculants to the Australian grains and pasture industries | 246,355 |
| UWA00058 | Biological indicators of soil quality | 17,500 |
| UWA395 | Overcoming soil biological constraints to yield | 30,595 |
| VC19 | Innovations in stored-grain technology for post-harvest value adding | 10,000 |
| | **Total new farm products and services** | **3,852,112** |
| | **NEW GRAIN PRODUCTS** | |
| BBE00002 | Develop grains containing high levels of nutritionally important long-chain Omega-3 fatty acids, particularly EPS and DHA | 101,500 |
| BRI00033 | Development of Optimal Noodle Specifications for a Major Asian Noodle Manufacturer | 121,100 |
| CGF00001 | Grain Foods CRC Limited | 750,000 |
| CGF00002 | Grain Foods CRC Ltd—Director Fees | 25,000 |
| CSE00030 | Crop Biofactories Initiative | 1,765,000 |
| CSE00031 | A workshop to identify priorities for the Phosphine Resistance Initiative | 3,060 |
| CSE00040 | Registration and extension of the use of new ethyl formate formulations on stored grain and for structural treatment | 183,464 |
| CSE00042 | A diagnostic method to determine phosphine resistance in insects | 669,778 |
| CSE122 | Physical and biological strategies for grain storage and protection—Component 2—Harvest storage strategies for farmers | 24,008 |
| CSP00060 | Making wheat starch more competitive with maize or potato starches by improving its viscosity | 174,029 |
| CSP00067 | Coeliac Friendly Cereals: Developing Germplasm | 150,000 |
| CSP00084 | Development of wheat with altered carbohydrate digestibility (starches) for food and industrial applications | 536,000 |
| CSU10 | Understanding factors that affect grain quality for livestock production | 301,800 |
| DAN00075 | Statistical analysis and data mining for the Premium Grains for Livestock Program | 159,207 |
| DAN00083 | Resistance management of stored-grain insects in the southern region | 146,150 |
| DAN00097 | National independent quality assurance and germplasm maintenance for *Rhizobium* inoculants | 111,000 |
| DAQ00005 | Strong resistance to phosphine in Chinese rice weevil | 17,372 |
| DAQ00066 | Managing Mycotoxin Contamination of Maize | 105,026 |
| DAQ00075 | Optimising grain yield and quality: Integrating high-moisture harvesting and grain storage strategies | 600,000 |
| DAQ00090 | Resistance Monitoring and Management—Northern Region | 113,786 |
| DAQ00098 | Phosphine fumigation of cool grain | 94,572 |
| DAW00069 | SIP10 New Grain Products | 53,650 |
| DAW00129 | Resistance Monitoring and Management—Western Region | 83,970 |
| EHC00001 | Consultancy Agreement—High-amylose Wheat Joint Venture | 3,500 |

| Project no. | Project title | Expenditure $ |
|---|---|---|
| EMF00001 | Consultancy Agreement—A research trip and report on biomass ethanol technologies in North America, and preliminary crop biomass mapping | 24,925 |
| GOG00001 | Go Grains—Membership Subscription 2005–06 | 250,000 |
| GOG00002 | Go Grains—Communication Program 2005–06 | 200,000 |
| JLB2 | Premium Grains for Livestock Program 2: Component 1. Coordination | 170,000 |
| JPC00001 | Crop Biofactories Initiative—International Reference Panel | 16,888 |
| KSS00001 | Consultancy Agreement—Premium Grains for Livestock Program NIR Case Study | 9,389 |
| KSS00002 | Ridley Case Study, Ingham, QAF and Grainsearch Case Studies, ABB Case Study | 6,000 |
| PBS00003 | Consultancy Agreement—CSIRO–Limagrain High-amylose Wheat Project | 4,482 |
| PCL00001 | CRC for an Internationally Competitive Pork Industry | 30,000 |
| SKC00001 | Alternative oilseed crops as potential production platforms for high-value industrial oils in Australia—linked to CSE00030 | 8,000 |
| SMC00001 | Consultancy Agreement—Go Grains Health and Nutrition Ltd | 20,000 |
| TCC00001 | Consultancy Agreement—Feed Grains | 42,409 |
| US312 | Premium Grains for Livestock Program 2: Component 2. Production, storage and distribution of grain samples | 272,250 |
| UT00006 | Understanding and market-targeting the fermentability of Australian malt | 26,500 |
| UWA00062 | Development of value-added plant protein products for the aquaculture feeds sector | 93,020 |
| VC01 | Market Intelligence: Existing | 10,000 |
| VC17 | Contribution to the Premium Grains for Livestock program | (220,000) |
| VC22 | Objective quality assessment to facilitate feedgrain trading | 825 |
| VC22-1 | Objective quality assessment to facilitate feedgrain trading | 3,767 |
| WJM00003 | Coordination of registration of grain storage chemicals | 62,650 |
| | **Total new grain products** | **7,324,077** |
| | **TOTAL NEW PRODUCTS** | **11,176,189** |
| | **BUILDING RESEARCH CAPACITY** | |
| AAC00001 | Conference Sponsorship—Agriculture Australia 2006 | 8,000 |
| AGH00001 | Preparation of Precision Agriculture Manual | 13,267 |
| AIA00002 | Conference Sponsorship—Rural Land Use—Farmers' Rights, Obligations and Futures | 1,200 |
| AIA00003 | Conference Sponsorship—Future Directions for Australian Agriculture | 1,200 |
| ANU00004 | Environmental Management Systems in Agriculture: A Comparative Analysis of Initiatives in the European Union and Australia | 84,250 |
| ANU18 | Australian Centre for Intellectual Property in Agriculture | 165,313 |
| AOF00004 | Oilseeds Industry Development Officer—Expansion of oilseed crops | (30,000) |
| APE00002 | Conference Sponsorship—Australasia–Pacific Extension Network (APEN) 2006 International Conference | 10,000 |
| APP00002 | Conference Sponsorship—Fourth Australasian Soilborne Diseases Symposium | 5,000 |
| ARL00005 | Australian Rural Leadership Program | 98,000 |
| ASF00004 | Conference Sponsorship—Fifteenth Australian Sunflower Conference | 7,940 |
| ATA41 | Agricultural Training Award—to study at Australian Agricultural College Corporation, Dalby Campus | 5,000 |
| ATA42 | Agricultural Training Award—to study at Australian Agricultural College Corporation, Dalby Campus | 5,000 |
| ATA43 | Agricultural Training Award—to study at the Australian Agricultural College Corporation, Emerald Campus | 5,000 |
| ATA44 | Agricultural Training Award—to study at CB Alexander Agricultural College Tocal | 5,000 |

| Project no. | Project title | Expenditure $ |
|---|---|---|
| ATA45 | Agricultural Training Award—to study at CB Alexander Agricultural College Tocal | 5,000 |
| AWO00001 | Conference Sponsorship—Women Unite: Working together for rural Australia | 7,500 |
| BA00001 | Travel Award—to investigate supply chain quality trademarking in the malting barley industry | 3,800 |
| BAE00012 | Conference Sponsorship—Fiftieth Annual Conference and workshop of the Australian Agricultural and Resource Economics Society (AARES) | 5,500 |
| BRI00032 | Research Horizons for Grain Leaders of the Future Course | 200,600 |
| BRS00009 | Sponsorship of 2006 Science and Innovation Awards for Young People in Agriculture, Fisheries and Forestry | 40,000 |
| BWD00009 | Travel Award—to attend the Canadian Wheat Board Conference | 2,545 |
| CAC00001 | Travel Award—to visit five regions of Western Australia to inform farmers and their families of the Canadian experience with GM canola adoption | 3,500 |
| CAC00002 | Industry Development Award—to participate in a canola GMO study tour in Canada | 13,636 |
| CFM00005 | Conference Sponsorship—Water for Irrigated Agriculture and the Environment | 5,000 |
| CSE00039 | Travel Award—to attend the Plant and Animal Genome Fourteenth Conference | 2,000 |
| CSP00069 | Conference Sponsorship—Eighth International Congress of Plant Molecular Biology | 50,000 |
| CSP00070 | Travel Award—to attend the CIMMYT Fusarium Head Blight Workshop | 2,395 |
| CSP00072 | Travel Award—to attend the Gordon Conference on Salt and Water Stress in Plants | 3,625 |
| CSP00073 | Travel Award—to attend the Thirteenth Australian Agronomy Conference | 1,270 |
| CSP00074 | Travel Award—to attend Biohydrology 2006 and visit the Scottish Crop Research Institute and the University of Wales | 3,155 |
| CSP00075 | Travel Award—to attend the Second Central Asian Cereal Conference | 3,800 |
| CSP00082 | Conference Sponsorship—Fenner Conference on the Environment 2006—Integrating agricultural and environmental imperatives for a profitable and sustainable future | 2,500 |
| CWC00002 | Travel Award—to attend the International Soil Tillage Organisation Seventeenth Triennial Conference | 2,800 |
| CWF00008 | Conference Sponsorship—Central West Conservation Farming Association Annual Seminar and Field Day 2006 | 7,500 |
| DAN00091 | Travel Award—to attend and present at the World Grains Summit: Foods and Beverages and the 2006 Gluten Workshop | 3,685 |
| DAN00092 | Travel Award—to attend and present at the World Grains Summit: Foods and Beverages and visit laboratories | 2,500 |
| DAN00093 | Travel Award—to attend the First International Ascochyta Workshop on Grain Legumes | 4,000 |
| DAQ00102 | Travel Award—to visit Tajikistan | 5,000 |
| DAS00060 | Travel Award—to attend the Thirteenth Australasian Plant Breeding Conference | 864 |
| DAS00061 | Travel Award—to attend the Thirteenth Australasian Plant Breeding Conference | 1,345 |
| DAS00062 | Travel Award—to attend the Thirteenth Australasian Plant Breeding Conference | 1,441 |
| DAS00063 | Travel Award—to attend the Haploids in Higher Plants III Conference | 1,482 |
| DAS00064 | Travel Award—to attend the Seventh Plant Growth Promoting Rhizobacteria Workshop | 3,364 |
| DAS00068 | Travel Award—to attend the World Grains Summit: Foods and Beverages and the 2006 Gluten Workshop | 3,695 |
| DAS00069 | Travel Award—to attend the North American Alfalfa Improvement Conference | 2,100 |
| DAV00068 | Conference Sponsorship—CTF06—Fourth Australian Controlled Traffic Farming Conference | 10,000 |
| DAV00074 | Travel Award—to attend the Eighteenth World Congress of Soil Science | 4,000 |
| DAV00075 | Travel Award—to attend the Eleventh International Association for Plant Tissue Culture and Biotechnology | 5,000 |
| DAW00135 | Travel Award—to attend the Thirteenth Australasian Plant Breeding Conference | 2,245 |

| Project no. | Project title | Expenditure $ |
|---|---|---|
| DAW00136 | Travel Award—to attend the Haploids in Higher Plants III Conference | 3,455 |
| DAW00137 | Travel Award—to attend the Eighteenth World Congress of Soil Science | 3,182 |
| DAW00142 | Travel Award—to attend the International Symposium of Balance Fertilization for Sustaining Crop Productivity | 2,120 |
| DAW00143 | Travel Award—to attend the Fifteenth Australian Weeds Conference | 1,200 |
| DAW00144 | Travel Award—to visit the University of Wyoming's Sustainable Agriculture Research and Extension Center on a technical exchange | 2,000 |
| FGI00003 | Travel Award—to attend the Hart Field Day 2006 | 1,020 |
| FGI00004 | Travel Award—to attend the Hart Field Day 2006 | 1,020 |
| GCA00009 | Conference Sponsorship—*Grains Week 2006* | 50,000 |
| GIT00001 | An audit of the grains industry capacity learning options coverage—GRDC southern region | 46,000 |
| GRD175 | GRDC Industry Development Awards | 4,000 |
| GRD30-1 | GRDC Grower Group Awards—State and National Winner | 12,000 |
| GRS100 | Grains Industry Research Scholarship (CUR)—Wheat quality and product requirements for steamed breads and steamed buns made from soft and hard wheat | 30,000 |
| GRS101 | Grains Industry Research Scholarship (UWA)—Metabolomic profiling in plants to understand the role of mitochondria in environmental stress tolerance | 30,000 |
| GRS102 | Grains Industry Research Scholarship (UWS)—Managing competitive rhizobial populations of low effectiveness in New South Wales chickpea cropping soils | 30,000 |
| GRS103 | Grains Industry Research Scholarship (UA)—The isolation and characterisation of meiosis-specific proteins in bread wheat | 30,000 |
| GRS104 | Grains Industry Research Scholarship (UA)—An examination of the role of the thioredoxin h family in the stress response of cereals | 30,000 |
| GRS105 | Grains Industry Research Scholarship (SWI)—Investigation of the gene family encoding aquaporins, the protein channels regulating water movement, in wheat | 30,000 |
| GRS106 | Grains Industry Research Scholarship (UMU)—Regulation of nitrogen fixation in *Sinorhizobium meliloti* on the annual pasture legume medicago | 30,000 |
| GRS107 | Grains Industry Research Scholarship (UWA)—Wheat root architecture response to heterogenous spatial and temporal supply of potassium in sandy soils | 30,000 |
| GRS108 | Grains Industry Research Scholarship (ANU)—Characterisation of aluminium tolerance genes in crop plants | 30,000 |
| GRS109 | Grains Industry Research Scholarship (UWA)—Physiological and molecular basis of salt tolerance in *Lotus glaber*, a new perennial pasture legume for salt-affected land | 30,000 |
| GRS110 | Grains Industry Research Scholarship (UWA and CSP)—Molecular and genetic analysis of plant resistance to spotted alfalfa and spotted clover aphids | 10,000 |
| GRS114 | Grains Industry Research Scholarship (UQ)—Discovery of genes involved in transmitting the long-distance RNA silencing signal | 13,750 |
| GRS115 | Grains Industry Research Scholarship (ULA)—Characterisation on the XERO2 system in *Araidopsis thaliana* | 10,000 |
| GRS116 | Grains Industry Research Scholarship (UMU)—The role of secondary metabolites of the model legume, *Medicago truncatula*, in plant defence against fungal pathogens | 8,750 |
| GRS117 | Grains Industry Research Scholarship (RMIT)—Ingredients, fortification and colour characteristics of instant noodles | 13,750 |
| GRS119 | Grains Industry Research Scholarship (SWI)—Investigations of wheat genes encoding immunophilins involved in regulations of storage protein folding, chloroplast function and plant development | 13,750 |
| GRS120 | Grains Industry Research Scholarship (UM)—Population genetics of the lucerne flea with applications for biocontrol | 12,500 |
| GRS121 | Grains Industry Research Scholarship (UM)—Sustainable resistance of *Brassica napus* to *Leptosphaeria maculans* | 8,750 |

| Project no. | Project title | Expenditure $ |
|---|---|---|
| GRS52 | Grains Industry Research Scholarship (RMIT)—Discovering novel genes controlling the resistance response to ascochyta blight in chickpeas | 15,000 |
| GRS56 | Grains Industry Research Scholarship (UWA)—Chromosomal regions controlling salt tolerance in wheat and wild relatives | 17,500 |
| GRS66 | Grains Industry Research Scholarship (UWA)—Interactions between environmental factors and mechanisms involved in pre-harvest sprouting tolerance in wheat | 45,000 |
| GRS67 | Grains Industry Research Scholarship (UA)—QTL determination under association mapping | 28,750 |
| GRS68 | Grains Industry Research Scholarship (UMO)—The impact of organic amendments on phosphorus availability in acid cropping soils | 30,000 |
| GRS69 | Grains Industry Research Scholarship (UNE)—Development and application of a decision framework for the introduction of plant-based solutions to salinity and relevant policy | 30,000 |
| GRS70 | Grains Industry Research Scholarship (UQ)—Pathotypes, epidemiology and economic importance of sorghum rust (*Puccinia purpurea*) in Australia | 30,000 |
| GRS71 | Grains Industry Research Scholarship (ULA)—Functional characterisation of myb genes involved in the control of anther and pollen development | 30,000 |
| GRS72 | Grains Industry Research Scholarship (ANU)—Overcoming cereal root diseases that are induced at low temperatures | 37,500 |
| GRS73 | Grains Industry Research Scholarship (US)—Environmental signalling in plants: the role of phospholipase and microtubules | 36,250 |
| GRS74 | Grains Industry Research Scholarship (SWI)—Identification and evaluation of genetic factors determining grain texture in wheat | 30,000 |
| GRS76 | Grains Industry Research Scholarship (USQ)—Genetic Engineering of Wheat for Cold Tolerance | 30,000 |
| GRS77 | Grains Industry Research Scholarship (UM)—Factors affecting yield decline in canola | 33,750 |
| GRS80 | Grains Industry Research Scholarship (UM)—How long can Australian agriculture neglect fortuitous biological control as a sustainable provider of pest control? | 30,000 |
| GRS81 | Grains Industry Research Scholarship (US)—Genetic and pathogenic variation in field population of the crown rot fungus (*Fusarium pseudograminearum*) | 30,000 |
| GRS82 | Grains Industry Research Scholarship (UMU)—Disease resistance to *Phythopthora* in *Medicago truncatula* | 30,000 |
| GRS83 | Grains Industry Research Scholarship (ULA)—Pollen development in plants | 30,000 |
| GRS84 | Grains Industry Research Scholarship (CSP and UQ)—Isolation and characterisation of transcription factors from wheat involved in drought adaptation | 30,000 |
| GRS85 | Grains Industry Research Scholarship (UWA)—The biology and control of *Salsola tragus* | 30,000 |
| GRS86 | Grains Industry Research Scholarship (UWA)—Host Plant Resistance in *Medicago truncatula* (Leguminosae) to *Acrythosiphonpisum* (Aphididae) | 30,000 |
| GRS87 | Grains Industry Research Scholarship (RMIT)—Enhancing crop utilisation through chloroplast-targeted expression of cellulase genes in plants | 30,000 |
| GRS88 | Grains Industry Research Scholarship (UM)—Biosynthesis and role of fungal toxins in blackleg disease of canola | 30,000 |
| GRS89 | Grains Industry Research Scholarship (RMIT)—Molecular interactions during preparation of Asian noodles and manipulation of nutritional and organoleptic characteristics | 30,000 |
| GRS90 | Grains Industry Research Scholarship (US)—Precision agriculture and whole-farm planning for sustainability | 30,000 |
| GRS91 | Grains Industry Research Scholarship (CSIRO Molecular Science)—Lignin from various straws as a renewable source of monomer (and other feedstock chemicals) | 30,000 |
| GRS94 | Grains Industry Research Scholarship (CSP and UQ)—Wheat with enhanced resistance to *Fusarium* diseases | 30,000 |

| Project no. | Project title | Expenditure $ |
|---|---|---|
| GRS99 | Grains Industry Research Scholarship (UMU)—Metabolism and infection in the *Stagonospora nodorum*–wheat pathosystem | 30,000 |
| GSI00001 | Conference Sponsorship—The Western Australian State Natural Resource Management Conference: 'Sustainability Side by Side' | 5,000 |
| ICA00001 | Travel Award—to present at *Grains Week 2006* and visit the Australian Winter Cereals Collection | 4,400 |
| IDA00005 | Industry Development Award—to investigate the potential of Brazilian disc seeders | 8,000 |
| IDA00006 | Industry Development Award—Beyond the Boundaries study tour | 15,000 |
| IDA00007 | Industry Development Award—Western Australian farming systems tour | 15,000 |
| IDA00008 | Industry Development Award—tour to South-east Asia: Raising growers awareness and knowledge of the supply chain management of the Australian grains industry | 15,000 |
| IDA00009 | Industry Development Award—exchange tour to Victoria | 14,750 |
| IDA00010 | Industry Development Award—precision spray application technology study tour | 15,000 |
| IDA00011 | Industry Development Award—exchanging ideas with the Victorian Group | 13,897 |
| IDA00012 | Industry Development Award—to attend the Esperance Downs Research Station South East Premium Wheat Growers Association Field Day | 1,500 |
| IDA00013 | Industry Development Award—study tour to South Australia | 13,800 |
| IDA00014 | Industry Development Award—to examine production systems to maximise water use efficiency in lateritic soils | 15,000 |
| IDA00015 | Industry Development Award—capacity-building study tour to Western Australia | 8,625 |
| IPR00001 | Vavilov-Frankel Fellowship | 38,000 |
| JLC00010 | Travel Award—to attend three Grains Research Updates and the 2006 South Australian No-till Farmers Association conference | 7,273 |
| MAA00004 | Conference Sponsorship—Maize Association of Australia Sixth Triennial Conference | 16,500 |
| NUF00007 | Nuffield Farming Scholarships | 135,000 |
| NYS2 | National Youth Science Forum 2004–2007 | 25,000 |
| PAL00010 | Travel Award—to attend the CICILS/IPTIC (International Pulse Trade and Industry Confederation) international pulse industry annual executive meetings and convention 2006 | 7,273 |
| PAL00011 | Conference Sponsorship—Focus 2006: Pulses in the feed industry (lupins, peas, beans) | 6,000 |
| PDF47 | Post-doctoral Fellowship Award (UM) to study the sclerotinia stem rot of oilseed brassicas: molecular mechanisms involved in infection | 47,795 |
| PDF48 | Post Doctoral Fellowship Award (UM) to study lowering of nutritionally undesirable saturates in *Brassica napus* and *Brassica juncea* oils using post-transcriptional gene silencing | 67,508 |
| PFG00001 | Travel Award—to attend the Gordon Conference on Salt and Water Stress in Plants and laboratory visits | 3,138 |
| PRA00002 | Travel Award—to attend the Thirteenth Australian Agronomy Conference | 1,500 |
| PSD25-1 | Australian Agriculture and Natural Resources Online (AANRO) Database | 32,151 |
| QGR00003 | Industry Development Award—to conduct a Brazilian study into ethanol as an alternative fuel source | 4,545 |
| RCI00003 | Conference Sponsorship—Fifty-sixth Royal Australian Chemical Institute Cereal Chemistry Conference 2006 | 5,000 |
| RMI00004 | Travel Award—to attend the Thirteenth Australasian Plant Breeding Conference | 1,364 |
| SAN00012 | Conference Sponsorship—Eighth Annual South Australian No-till Farmers Association Conference 2006 | 10,000 |
| SFS00005 | Developing Leadership Skills in Young Growers | 41,000 |
| SNP00001 | Travel Award—to visit Syria, Armenia and Tajikistan to film part of a documentary about the work of Dr Ken Street from ICARDA | 15,000 |

| Project no. | Project title | Expenditure $ |
|---|---|---|
| SPA00006 | Conference Sponsorship—Tenth Symposium on Precision Agriculture Research and Implementation in Australasia | 10,000 |
| UA00089 | Travel Award—to attend the Eighteenth World Congress of Soil Science and Phosphorus Dynamics in the Soil–Plant Continuum | 3,636 |
| UF00006 | Travel Award—to attend the 2006 Joint Meeting of the American Phytopathological Society, Canadian Phytopathological Society and Mycological Society of America (APS Annual Meeting) | 6,000 |
| UHS100 | Undergraduate Honours Scholarship (UQ)—Investigating the genetics of resistance to phosphine in insect pests of stored grain | 6,000 |
| UHS101 | Undergraduate Honours Scholarship (UQ)—Mechanisms of long-distance RNA silencing in plants | 6,000 |
| UHS102 | Undergraduate Honours Scholarship (UT)—Wheat phenology and development under grazing conditions for dual-purpose production | 6,000 |
| UHS103 | Undergraduate Honours Scholarship (UWA)—Seed dynamics, establishment and regeneration of salt-tolerant pasture legumes | 6,000 |
| UHS104 | Undergraduate Honours Scholarship (UWA)—Processing chaff residue during the harvest operation as an alternative to chaff carts for preventing the return of weed seed to the soil seedbank | 6,000 |
| UHS105 | Undergraduate Honours Scholarship (UWA)—Economies of scale in farming systems of the Western Australian wheat belt | 6,000 |
| UHS106 | Undergraduate Honours Scholarship (UWA)—Investigation of barley grass resistant to the Group B herbicide Monza | 6,000 |
| UHS107 | Undergraduate Honours Scholarship (UWA)—Evaluation of derivative and marketing risk matching grower risk profiles | 6,000 |
| UHS93 | Undergraduate Honours Scholarship (UF)—Unravelling the communication in the beneficial plant: endophytic actinobacterial relationship | 6,000 |
| UHS94 | Undergraduate Honours Scholarship (SWI)—Investigations of the structure and diversity of water channel proteins of the plasma membrane intrinsic protein (PIP) class involved in regulating water flow in wheat | 6,000 |
| UHS95 | Undergraduate Honours Scholarship (UA)—Latent infection of lentils by botrytis species | 6,000 |
| UHS96 | Undergraduate Honours Scholarship (UM)—Economic analysis of precision agriculture systems in whole farm systems | 6,000 |
| UHS97 | Undergraduate Honours Scholarship (UM)—Characterisation of a mutant of the blackleg fungus, *Leptosphaeria maculans*, with reduced pathogenicity on canola | 6,000 |
| UHS99 | Undergraduate Honours Scholarship (UM)—Distribution and pest status of cryptic blue oat mite species | 6,000 |
| UM00025 | Travel Award—to attend the Thirteenth Australasian Plant Breeding Conference | 1,455 |
| UMI00001 | Conference Sponsorship—'Bioscience and Biotechnology Policy' pre-conference workshop of the Twenty-sixth Conference on the International Association of Agricultural Economics (IAAE) plus post-conference workshop 'Future Directions for Agricultural Research' | 20,000 |
| UMU00023 | Travel Award—to attend the Eighteenth World Congress of Soil Science | 4,000 |
| UMU00024 | Conference Sponsorship—Seventh Australasian Plant Virology Workshop | 8,000 |
| UNE00007 | Graduate Certificate in Sustainable Farm Production | 185,048 |
| UQ00034 | Improving understanding and awareness of intellectual property amongst graingrowers in Australia | 199,950 |
| UQ00038 | Conference Sponsorship—Third International Conference on Legume Genomics and Genetics | 10,000 |
| UQ00039 | Travel Award—to combine migration data with climate change and crop phenology data to develop artificial neural network models for improved prediction of *Helicoverpa armigera* outbreaks in Australia | 1,564 |

| Project no. | Project title | Expenditure $ |
|---|---|---|
| US00034 | Travel Award—to attend the Eighteenth World Congress of Soil Science | 4,000 |
| US00035 | Travel Award—to attend the International Plant Breeding Symposium | 3,410 |
| USA00003 | Travel Award—to attend the International Soil Tillage Research Organisation 2006 and CIGR (International Commission of Agricultural Engineering) Agricultural World Congress 2006 | 4,230 |
| USA00004 | Travel Award—to attend the International Soil Tillage Research Organisation 2006 and CIGR (International Commission of Agricultural Engineering) Agricultural World Congress 2006 | 3,877 |
| USQ00009 | Conference Sponsorship—Workshop on Hyperspectral Remote Sensing and Field Spectroscopy of Agricultural Crops and Forest Vegetation | 2,000 |
| UT00010 | Travel Award—to attend the Ninth Congress of the European Society for Agronomy | 3,080 |
| UT12 | Building human capacity through schools into university and then primary industry | 105,000 |
| UWA00098 | Travel Award—to attend the Plant Animal Genome XIV Conference | 1,364 |
| UWA00099 | Travel Award—to visit research groups investigating control of *Salsola tragus* | 3,153 |
| UWA00100 | Conference Sponsorship—Australian Society of Agronomy Conference | 10,000 |
| UWA00105 | Travel Award—to attend the First International Ascochyta Workshop on Grain Legumes and several meetings | 2,500 |
| UWA00106 | Travel Award—to attend the International Conference on Interdisciplinary Social Sciences | 2,800 |
| VAN00002 | Conference Sponsorship—Fourth Annual Victorian No-till Farmers Association Conference | 6,000 |
| VF00002 | Visiting Fellowship Award (DAQ)—Transfer of multiple Russian wheat aphids biotype resistance to Australian wheat backgrounds | 5,000 |
| VF00003 | Visiting Fellowship Award (CMB)—International networking in wheat genomics and flour quality | 5,000 |
| VF00004 | Visiting Fellowship Award (CMB)—Improving the estimation of QTL effects in winter cereal mapping experiments | 10,000 |
| VF00005 | Visiting Fellowship Award (UMU)—International links for western region nutrient management research | 15,000 |
| VF67 | Visiting Fellowship Award (CSA)—Improved physiological understanding of canopy development and tillering in cereals | 13,500 |
| VFF00005 | Conference Sponsorship—Victorian Farmers Federation Annual Grains | 7,000 |
| VIC00005 | Conference Sponsorship—GRDC Irrigation Update | 3,500 |
| WAF00004 | Conference Sponsorship—Western Australian Farmers Annual Conference 2006 | 7,000 |
| WAN00010 | Conference Sponsorship— Western Australian No-Tillage Farmers Association Conference 2006 | 10,000 |
| WAN00011 | Industry Development Award—to conduct a study tour to investigate cover crops and full stubble retention no-till systems in Brazil | 7,273 |
| WMS00001 | Conference Sponsorship—Fifteenth Australian Weeds Conference | 10,500 |
| | **Total building research capacity** | **3,519,871** |
| | **CUSTOMER SERVICES** | |
| AFL00001 | Farm Productivity Growth in Australian Agriculture | 10,000 |
| AFQ00005 | Research Advisory Committee Northern Region | 70,000 |
| BAE00008 | Expert advice for the economic and strategic development of the Australian grains industry | 643,000 |
| CCS01-1 | GRDC Customer Database (PSD35) | 770 |
| CSA00009 | Available Water Content—for workshop delivery to growers | 54,024 |
| DAN00047 | Cropcheck for Irrigated and Dryland Cropping | 103,870 |

| Project no. | Project title | Expenditure $ |
|---|---|---|
| DAQ00068 | Networking Innovation in Grower Groups | 100,171 |
| DAV00044 | Bestwool | 90,000 |
| DAW00078 | Continuing the Crop Updates Partnership | 115,447 |
| GSP00001 | Explore, develop and facilitate the areas of strategic improvement between the southern panel and consultants | 39,000 |
| ICF00006 | Oilseeds Industry Development Officer—Expansion of oilseed crops (with a focus on canola and soybean) for the irrigation and dryland areas of southern New South Wales and Victoria | 130,000 |
| ICN00003 | Northern Region Grains Research Updates | 178,405 |
| ICN00005 | Integrated Weeds Management Workshop | 30,450 |
| JLC00008 | Southern Region Grains Research Updates | 303,200 |
| LWR00002 | Knowledge management in irrigated cotton and grains | 105,000 |
| MIG00008 | The Grower Group Alliance—Innovation through grower groups | 174,259 |
| NCA00006 | Consultancy Agreement—Database development/trend analysis | 30,000 |
| NCA00007 | Product and services in relation to business objectives and strategies | 50,000 |
| NFA00004 | Southern New South Wales Research Advisory Committee | 25,000 |
| RDC14 | Joint Farm Health and Safety Program | 60,000 |
| RMP00001 | Development of 2006 Grains Research Updates CD | 39,505 |
| SAF00003 | South Australian Research Advisory Committee | 25,000 |
| UWA00082 | Improving the adoption of technology by neighbourhood grower groups | 180,102 |
| VFF00004 | Victorian Research Advisory Committee | 25,000 |
| | **Total customer services** | **2,582,203** |
| | **CORPORATE COMMUNICATIONS** | |
| AAA00004 | GMOs—Guiding Meaningful Opinions | 100,000 |
| AFF00003 | Corporate Governance for Women Sponsorship | 11,306 |
| BCA00002 | Western Region Communicator 03–06 | 97,652 |
| BER00003 | Australian Grain Yearbook | 50,400 |
| BER00004 | National Farm Groups Field Research | 20,700 |
| BER00005 | International Research Review | 28,900 |
| CAC00003 | Conference Sponsorship—'What GM Crops Have to Offer Western Australian Farmers' | 10,000 |
| CAN00001 | Canprint—Warehouse and distribution of GRDC publications, periodicals and promotional material | 68,710 |
| CIC00002 | Conduct media review and analysis and planning workshop to prepare a communication plan for the GRDC northern region | 13,500 |
| COR00003 | *Ground Cover* newspaper | 1,140,000 |
| COR00005 | Magazine supplements to the GRDC's *Ground Cover* in October 2005, December 2005, February 2006 and April 2006 | 150,000 |
| COR00006 | Root Map Concepts—DAFWA Spray Charts | 3,665 |
| DAQ00099 | Sorghum Disorders: The Ute Guide | 41,489 |
| DAQ00100 | Maize Disorders: The Ute Guide | 30,843 |
| DAQ00101 | Sunflower Disorders: The Ute Guide | 30,699 |
| DER00008 | Research Partner Survey | 46,100 |
| JLC34 | National Branched Broomrape Communication Strategy | 25,000 |
| KDI00014 | The Workboot Series—*Wheat, the story of wheat in Australia* and Resources Kit | 27,500 |
| MAA00005 | The COB Magazine | 10,000 |

| Project no. | Project title | Expenditure $ |
|---|---|---|
| MCC00002 | Project Review 2005—Research Horizons for Grains Leaders of the Future Course | 22,800 |
| MMO00001 | Media analysis report on the GRDC's national and regional media products distributed | 45,750 |
| P&SD03-1 | Program Audit | 9,904 |
| P&SD09 | Customer Relationship Management Database | 13,150 |
| PIG00003 | Partners in Grain: A national professional development network for graingrowers | 190,000 |
| PNS00001 | Southern Region Communicator 2003–06 | 212,001 |
| PSD01.1 | Corporate Communications | 33,809 |
| PSD18 | Continuation of current and new surveys | 11,635 |
| PSD21 | Communication Campaigns and Information Packaging | 33,628 |
| PSD22 | Farming Ahead Articles | 55,140 |
| REP00002 | Northern Region Communicator 2003–06 | 74,320 |
| TQA00003 | Organisational and program performance indicators | 167,376 |
| UCS00007 | National Partners in Grains | 15,541 |
| WDM00006 | Paddock Diary 2005–06 | 39,090 |
| | **Total corporate communications** | **2,830,609** |
| | **TOTAL COMMUNICATION AND CUSTOMER SERVICES** | **8,932,683** |
| | **ENHANCED MANAGEMENT** | |
| GCA00010 | Contribution to Pathways to Industry Environmental Management System Project | 20,500 |
| GCA00011 | AQIS Grains Industry Consultative Committee | 8,640 |
| GCA00012 | Market Access Biosecurity Grains Industry Consultative Committee | 10,700 |
| GCA00013 | AQIS–Pulse Australia Industry Working Group | 3,200 |
| GCA00014 | National Agricultural Commodities Marketing Association Market Standards and Trade | 1,280 |
| GCA00015 | Hong Kong Ministerial—World Trade Organisation | 17,950 |
| GCA00016 | Geneva Ministerial—World Trade Organisation | 10,300 |
| GCA00017 | Seed Industry Consultation and Seed Industry Reference Group | 17,500 |
| GRD172 | Global Crop Diversity Trust | 1,182,529 |
| GRD199 | Single Vision Grains Australia | 1,107,241* |
| GRD201 | Graingene III | (1,030,918) |
| VR53 | Graingene III | 2,061,835 |
| | **TOTAL ENHANCED MANAGEMENT** | **3,410,757** |
| | **GRAND TOTAL** | **115,329,405** |

*Cash payments for the year—$925,290

ACIAR = Australian Centre for International Agricultural Research, ANU = Australian National University, AQIS = Australian Quarantine and Inspection Service, AWCMMP = Australian Winter Cereals Molecular Marker Program, CIMMYT = International Maize and Wheat Improvement Center, CMB = Centre for Molecular Biotechnology, CRC = cooperative research centre, CSA = CSIRO Sustainable Ecosystems, CSIRO = Commonwealth Scientific and Industrial Research Organisation, CSP = CSIRO Plant Industry, CUR = Curtin University of Technology, DAQ = Department of Agriculture Queensland, DAFWA = Department of Agriculture and Food Western Australia, EGA = Enterprise Grains Australia, GM = genetically modified, GMO = genetically modified organism, HRZ = high-rainfall zone, ICARDA = International Centre for Agricultural Research in the Dry Areas, IPM = integrated pest management, IWM = integrated weed management, MPBCRC = Molecular Plant Breeding Cooperative Research Centre, NIR = near-infrared spectroscopy, RMIT = Royal Melbourne Institute of Technology, SWI = Swinburne University of Technology, QTL = quantitative trait loci, UA = University of Adelaide, UF = Flinders University, ULA = La Trobe University, UM = University of Melbourne, UMO = Monash University, UMU = Murdoch University, UNE = University of New England, UQ = University of Queensland, US = University of Sydney, USQ = University of Southern Queensland, UT = University of Tasmania, UWA = University of Western Australia, UWS = University of Western Sydney

APPENDIX 3

# Joint R&D projects list

| R&D Partners | Project | Project title | Start date | Finish date |
|---|---|---|---|---|
| ACIAR, GRDC | ACA4 | Pulse project with ICARDA | 01-Jul-01 | 30-Jun-07 |
| ACIAR, GRDC | ACA5 | Oilseed Brassica Improvement in China, India and Australia | 30-Jun-02 | 30-Jun-07 |
| AWI, GRDC, MLA, DA, RIRDC | AWR00002 | Contribution towards Pastures Australia | 30-Jun-06 | 30-Jun-07 |
| AWI, GRDC | AWR00003 | Contribution towards National Annual Pasture Legume Improvement Program | 01-Jan-06 | 30-Jun-06 |
| AWI, GRDC | AWR00004 | Contribution towards the National Rhizobium Program | 01-Jul-05 | 30-Jun-08 |
| ACIAR, CSIRO, GRDC, RIRDC | DAN00002 | Permanent beds for sustainable farming on irrigated lands | 06-Jul-02 | 31-Dec-06 |
| RIRDC, MLA, APL, GRDC, SARDI, University of Sydney, University of New England, CSIRO, DPI Victoria, New South Wales Agriculture | DAN00075 | Statistical analysis and data mining for the Premium Grains for Livestock Program | 01-Jan-05 | 30-Jun-08 |
| RIRDC, MLA, APL, GRDC, SARDI, University of Sydney, University of New England, CSIRO, DPI Victoria, New South Wales Agriculture | JLB2 | Premium Grains for Livestock Program 2: Component 1. Coordination | 01-Jul-00 | 30-Jun-08 |
| LWA, GRDC | LWR00002 | Knowledge management in irrigated cotton and grains | 22-Mar-05 | 30-Jun-07 |
| LWA, GRDC, MLA | LWR23 | Contribution towards Grain and Graze Program | 01-Jul-03 | 30-Jun-08 |
| LWR, GRDC, NHT, DAFF, RIRDC, SRDC, DA, MLA | LWR25 | Contribution towards Managing Climate Variability Program | 01-Jul-03 | 30-Jun-07 |
| MLA, GRDC | MLA00001 | Contribution towards Pasture Soil Biology Program | 07-Jan-03 | 30-Jun-07 |
| RIRDC, GRDC | RDC14 | Joint Farm Health and Safety Program | 01-Jul-02 | 30-Jun-07 |
| RIRDC, MLA, APL, GRDC, SARDI, University of Sydney, University of New England, CSIRO, DPI Victoria, New South Wales Agriculture | US312 | Premium Grains for Livestock Program 2: Component 2. Production, storage and distribution of grain samples | 01-Jul-00 | 30-Jun-08 |
| AWI, GRDC | UWA360 | National Annual Pasture Legume Improvement Project—Western Australia | 01-Jul-00 | 30-Jun-06 |
| RIRDC, MLA, APL, GRDC, SARDI, University of Sydney, University of New England, CSIRO, DPI Victoria, New South Wales Agriculture | VC17 | Premium Grains for Livestock Program | 01-Jul-03 | 30-Jun-06 |

ACIAR = Australian Centre for International Agricultural Research, APL = Australian Pork Limited, AWI = Australian Wool Innovation, CSIRO = Commonwealth Scientific and Industrial Research Organisation, DA = Dairy Australia, DAFF = Department of Agriculture, Fisheries and Forestry, DPI = Department of Primary Industries, ICARDA = International Centre for Agricultural Research in the Dry Areas, LWA = Land and Water Australia, MLA = Meat and Livestock Australia, NHT = Natural Heritage Trust, RIRDC = Rural Industries R&D Corporation, SARDI = South Australian Research and Development Institute, SRDC = Sugar Research and Development Corporation

APPENDIX 4

# Portfolio monitoring and reviews

'Portfolio monitoring' is a broad term that covers a range of activities undertaken by the GRDC to ensure that individual projects achieve their objectives and scheduled milestones, and that the R&D portfolio as a whole continues to address industry and government stakeholder priorities. The portfolio in 2005–06 included around one thousand projects, at various stages of development, spread across four output groups.

The portfolio monitoring system includes internal guidelines and/or procedures for:

- identifying and managing risks associated with individual projects during planning and implementation stages
- evaluating progress reports for project performance against objectives
- developing business cases, terms of reference and time frames for a limited number of formal reviews of targeted investment areas from across the entire portfolio.

At the project level, portfolio monitoring involves an annual assessment of each project, by way of an annual progress report that identifies progress against the aims and milestones of the project. Satisfactory progress reports must be submitted to the corporation before further payments are made to research providers.

Other GRDC portfolio monitoring activities in 2005–06 included:

- external visits to research providers' facilities, including research laboratories and sites where field trials are carried out
- internal monitoring procedures to assess the performance and efficiency of administrative activities associated with managing the large investment portfolio. This includes tracking the status of progress reports against internal performance targets and producing summary reports for management and staff. This contributed to a significant reduction in the number of progress reports remaining outstanding (unprocessed) at 30 June 2006.

APPENDIX 5

# Publications and products

The GRDC has a large number of publications and information products, in print, tape and electronic formats. Many hard copy products are provided for free (stocks of some free publications are limited), while others are sold to fully or partially recover the costs of publication. There are some publications which are available only in electronic format and can be found on the GRDC's website, Grain*Zone*, at www.grdc.com.au.

Grain*Zone* also provides a catalogue of GRDC publications and an online bookshop. On average, Grain*Zone*'s home page received between 6,500 and 8,000 page views per month in 2005–06. The bookshop received approximately 1,600 page views per month.

Most of the GRDC's 2005–06 reports and publications are publicly available. Key publications released in 2005–06 are listed below.

| **Publications available to the public free of charge** | |
|---|---|
| *Back Pocket Guides*—<br>Identification guides for graingrowers | *Slugs in Crops* |
| Corporate publications | GRDC Annual Report 2006–07<br>GRDC Annual Operational Plan 2005–06 |
| *Farmer Advice Sheets*—<br>Information for graingrowers | *Resistant varieties vital to rust management*<br>*Managing Frost, Minimising Damage* |
| *Ground Cover*—<br>The grains industry research newspaper | Six issues and supplements:<br>57—Grain Storage<br>58—Precision Agriculture<br>59—Nutrient Management<br>60—Farm Safety<br>61—Subsoil Constraints<br>62—Pastures |
| Reviews of research | *Northern Grain Production: A farming systems approach* |
| Tools for graingrowers | *Paddock Diary 2006* |
| *Update Newsletters*—<br>Information for technical advisers | Issues 28, 29, 30 and 31, for the northern region<br>Issues 38, 39 and 40, for the southern region |
| **Publications available for sale to the public** | |
| Booklets | *Adjuvants: Oils, surfactants and other additives for farm chemicals*<br>*Cereal Growth Stages: The link to crop management*<br>*Raised Bed Farming in Western Australia*<br>*Managing Grey Clays to Maximise Production and Sustainability—Western Australia* |
| CDs | *Raised Bed Farming*<br>*2006 National Farm Trials Manual (GRIST)*<br>*Precision Agriculture Manual* |
| Educational resources for children | *The Wheat Book* |
| Reviews of research | *Australian Grain Yearbook 2006* |
| Software | *Lime and Nutrient Balance*, version 1.2 (including CD) |
| *Ute Guides*—<br>Identification tools for graingrowers | *Maize Disorders*<br>*Sorghum Disorders* |

APPENDIX 6

# GRDC Selection Committee

The Hon Sussan Ley MP
Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry
Parliament House
CANBERRA ACT 2600

Dear Ms Ley

## GRAINS REASEARCH AND DEVELOPMENT CORPORATION SELECTION COMMITTEE ANNUAL REPORT 2005-2006

The following report summarises the activities of the Grains Research and Development Corporation (GRDC) Selection Committee for the reporting period to 30 June 2006.

### Establishment of the Selection Committee

On 19 April 2005, Senator Colbeck, the then Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry, reappointed Mr. Dennis Mutton as Presiding Member of the GRDC Board Selection Committee. Mr Mutton was appointed for a period until 30 April 2008, in accordance with subsection 122(1) of the PIERD Act1989.

In accordance with section 124 of the PIERD Act, nominations were sought for members of the Selection Committee from the GRDC's representative industry organisation, the Grains Council of Australia, and the Parliamentary Secretary appointed the following people on 2 June 2005:

Members Mr Murray Jones
Mr Douglas Clarke
Mr Ian Hastings
Mr Greg Schulz

### Selection Process

In accordance with the above Act applications were called through placing advertisements in National, State and regional newspapers during the period 23-28 May 2005. The closing date for applications was 14 June 2005. In addition representative organisations were also contacted directly.

A total of 118 applications were received and the Selection Committee in establishing a short list for further consideration and interview, considered all applications. The Committee also was briefed on the future strategic directions of the Corporation.

Following detailed review of candidates 17 applications were scheduled for interview, which took place on 25 and 26 July 2005 in Melbourne. Referee checks were then conducted as required.

### Board Appointments

Upon completion of the process in accordance with section 131 of the PIERD Act, the Selection Committee forwarded six nominations to the Parliamentary Secretary on 7August 2005. The Parliamentary Secretary accepted the nominations and made the following appointments on 23 September 2005 for a three-year term commencing on 1 October 2005.

- Ms. Nicole Birrell. An independent consultant in governance and business management. Nicole also holds a number of directorships in not for profit and business enterprises. She brings to the GRDC significant capability in finance, compliance and economics with her experience gained in Australia and internationally. Her expertise also includes administration of research and development and direct involvement in the grains industry.

- Mr. Steve Marshall. An independent consultant in strategic review, global food assurance systems and organisational development with extensive international experience in food manufacturing directly related to the grains industry. Steve has qualifications in food science and technology. He brings expertise in administration of research and development, technology transfer and marketing. He is also a Director of the Rural Industries Research and Development Corporation.
- Dr. Donald Plowman. Appointed for a second term. An experienced research administrator with involvement in technology transfer, commercialisation of intellectual property and intergovernmental relations. His demonstrated capabilities also incorporate natural resource and environmental management and a comprehensive understanding of the primary industry sector.
- Prof. Timothy Reeves. A highly regarded scientist and science administrator both in Australia and internationally including as Director General of the International Maize and Wheat Improvement Centre, CIMMYT, in Mexico for seven years. His international grains research experience and knowledge provide strong input to research priority setting in all areas of interest to the grains industry. Tim also maintains a strong network throughout the farming community.
- Mr. Ross Johns. Appointed for a second term. A grain farmer and businessman with extensive experience in international grain marketing. He is also a Board Member of ABB Grain Ltd. He brings a perspective of regional Australia and the challenges and solutions in achieving viable rural industries. His demonstrated capabilities also include business management, grains production and processing and the management of natural resources.
- Mr. Philip Young. Qualified in agricultural science and economics with direct experience in grain production, processing and marketing, administration of research and development, and the management of natural resources. Philip consults internationally in agricultural related areas and was the inaugural Chair of Australian Grain Technology. He brings strong business and economic management expertise to the Board as well as extensive experience in technology transfer.

**Summary of Expenditure**

Expenditure by the Selection Committee to 30 June 2006 was:

| Item | Expenditure $ |
|---|---|
| Advertising | 10,211.85 |
| Consultants | 6,499.00 |
| Presiding Member Sitting Fees | 6,250.00 |
| Expenses Associated with Selection Process (Including airfares of members and candidates) | 28,960.69 |
| Total | 51,921.54 |

Yours sincerely

Dennis Mutton
Presiding Member
Grains Research and Development Corporation Selection Committee

30 July 2006

# Indexes

# Glossary

| | |
|---|---|
| 2005–06 | The financial year 2005–06; that is, 1 July 2005 to 30 June 2006 |
| ABARE | Australian Bureau of Agricultural and Resource Economics |
| abiotic stress | Stress caused to living organisms by non-living environmental factors, such as cold, heat or drought |
| ACPFG | Australian Centre for Plant Functional Genomics |
| AFLOMAN | A web-based decision support tool to help peanut growers assess the best time to harvest to achieve maximal returns and minimal aflatoxin contamination |
| agroecological region | A region defined by a characteristic interrelationship between agronomy/farming systems and various environmental features, not just climate |
| AgSafe | An independent subsidiary of CropLife Australia (the national body for the plant science industry) |
| AEIFRS | Australian Equivalents to International Financial Reporting Standards |
| AOF | Australian Oilseeds Federation |
| ascochyta | The pathogen that causes ascochyta blight, a serious disease of peas in Victoria and South Australia |
| AWCMMP | Australian Winter Cereals Molecular Marker Program |
| BBA | Barley Breeding Australia |
| biodiesel crops | Crops (particularly oilseeds) used to manufacture biodiesel, a renewable alternative to fossil fuels |
| biofactories | The utilisation of living organisms such as plants as a platform for the production of industrial and/or pharmaceutical materials through the application of biotechnology |
| bio-physical | The biological and physical components of the environment |
| biotic stress | Stress caused to living organisms by other living organisms, such as viruses, bacteria, insects or fungi |
| CAC Act | The *Commonwealth Authorities and Companies Act 1997*, which is complemented by the Commonwealth Authorities and Companies (Report of Operations) Orders 2005—orders made by the Finance Minister concerning the report of operations component of annual reporting |
| cereal crops | Members of the grass family grown for their edible, starchy seeds—for example, wheat, barley, oats, rye and triticale |
| CIMMYT | International Maize and Wheat Improvement Center, Mexico |
| CRC | cooperative research centre |
| CSIRO | Commonwealth Scientific and Industrial Research Organisation |
| DAFF | Australian Government Department of Agriculture, Fisheries and Forestry |
| DAFWA | Department of Agriculture and Food, Western Australia |
| DPI Victoria | Department of Primary Industries, Victoria |
| *Driving Innovation* | The GRDC Five Year Research and Development Plan 2002–07 |
| dryland | Land which is not irrigated and depends on rainfall to support crops |
| EMS | environmental management system |

| | |
|---|---|
| EPBC Act | *Environment Protection and Biodiversity Conservation Act 1999* |
| EPR | End Point Royalty |
| ESD | ecologically sustainable development |
| FOI Act | *Freedom of Information Act 1982* |
| GCA | Grains Council of Australia |
| Go Grains | Go Grains Health and Nutrition Ltd |
| Grain*Zone* | The GRDC website at www.grdc.com.au |
| GRDC | Grains Research and Development Corporation |
| *Ground Cover* | A free newspaper produced by the GRDC, with six editions each year |
| *Harvest Radio* | The GRDC's web-based initiative that provides technical information for graingrowers, including updates on research, trials, new varieties and farmer activities, and case studies |
| heliothis | A caterpillar pest of many grains and other crops |
| HOLL | high-oleic, low-linolenic |
| ICARDA | International Centre for Agricultural Research in the Dry Areas, Syria |
| IWM | integrated weed management |
| MLA | Meat and Livestock Australia |
| NAPLIP | National Annual Pasture Legume Improvement Program |
| NIR | near-infrared spectroscopy |
| NPBP | National Pulse Breeding Program |
| NVT | National Variety Trials |
| PDF | portable document format |
| phosphine | A colourless gas with a strong fishy smell, used as a pesticide |
| PIERD Act | *Primary Industries and Energy Research and Development Act 1989* |
| precision agriculture | The use of spatial information (such as yield maps) to better match crop agronomy techniques, such as fertiliser application, to paddock variations |
| pulses | The edible seeds of certain pod-bearing plants, such as peas and beans |
| R&D | research and development |
| RDC | research and development corporation |
| rhizobacteria | Bacteria found closely associated with plant roots |
| RIRDC | Rural Industries Research and Development Corporation |
| SARDI | South Australian Research and Development Institute |
| sclerotinia | Any fungus of the genus *Sclerotinia*; some cause brown rot diseases in plants |
| SVGA | Single Vision Grains Australia |
| *The Way Forward* | The GRDC strategic business plan |
| triazine | A class of herbicides—for example, atrazine, propazine, and simazine |

# Compliance index

**CAC Act requirements**

### PIERD Act requirements



### Other reporting requirements



### Other legislative requirements

# Alphabetical index

**d**

## Contact details


| | |
|---|---|
| Location | Level 1, Tourism House<br>40 Blackall Street<br>BARTON ACT 2600 |
| Postal address | GRDC<br>PO Box 5367<br>KINGSTON ACT 2604 |
| Contact officer | GRDC Compliance Officer<br>Phone: 02 6272 5525<br>Fax: 02 6271 6430<br>Web: www.grdc.com.au |


Grains Research & Development Corporation

## Delivery dates

| | |
|---|---|
| Submission of financial statements to the GRDC FR&A Committee | 25 July 2006 |
| Submission of final draft to the GRDC Board | 4 September 2006 |
| Certification of financial statements by the Australian National Audit Office | 31 July 2006 |
| Approval of final annual report by the GRDC Board | 25 September 2006 |
| Parliamentary Secretary to Minister for Agriculture, Fisheries and Forestry | 13 October 2006 |
| Minister for Agriculture, Fisheries and Forestry | 13 October 2006 |
| Australian Government Department of Agriculture, Fisheries and Forestry | 13 October 2006 |
| Tabling in Parliament | During the Spring session |
| Presentation to the Grains Council of Australia | On tabling |
| Presentation to State Grains Committees | Prior to *Grains Week* |
| Delivery of the Chair's report to industry | *Grains Week 2007* |

## Production notes


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*Meeting stakeholder needs*
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