Australian Government
Grains Research and Development Corporation

GRDC Annual Report 2009–10

GRDC
Grains Research & Development Corporation

www.grdc.com.au

The GRDC

The Grains Research and Development Corporation is a statutory authority established to plan and invest in R&D for the Australian grains industry.

Its primary objective is to support effective competition by Australian grain growers in global grain markets, through enhanced profitability and sustainability.

Its primary business activity is the allocation and management of investment in grains R&D.

GRDC Vision

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

Tom McCue, GRDC Manager Extension and Grower Programs.
Photo: GRDC

GRDC Values

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

GRDC Mission

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

Highlights of 2009–10

Successes

- External and internal financial analysis of GRDC projects showed benefit to cost ratios ranging from 2.3:1 to 13:1. Page 17
- The National Variety Trials demonstrated new wheat and barley varieties yielding up to 12 percent and 16 percent more than current dominant varieties with comparable quality and disease resistance. Page 59
- Breeding programs released new, improved crop varieties
  - four wheat varieties
  - three oat varieties
  - two desi chickpea varieties
  - two lentil varieties
  - one broad bean variety. Page 49
- Progress was made on the development of yield-enhancing traits in wheat.
- A baseline survey of farming management practices across agroecological zones concluded that
  - the adoption of no-till is extremely high, at over 90 percent of cropped area in most zones
  - approximately 66 percent of grain farms are using soil tests, representing over 75 percent of the cropped area in most zones
  - over 90 percent of the stubble produced on the farms surveyed was either left intact (highest in north-west New South Wales) or left not standing (highest in Victoria's high-rainfall zone).
- The GRDC played a leadership role in the development of the National Grains RD&E Strategy. Page 9
- The advanced prototype of the Harrington Weed Seed Destructor was field tested. Page 64
- Information packages on disease resistance were prepared, ready for incorporation into integrated pest management of sclerotinia and white rust in canola. Page 60
- Plans were developed for national integrated weed management and integrated pest management programs. Page 38
- Forecasting systems were implemented for stripe rust and wheat streak mosaic virus in Western Australia and blackspot in field peas in Western Australia and South Australia. Page 46
- A GRDC joint venture launched JumpStart®, a growth-enhancing phosphorus solubilisation product for use on cereals and canola. Page 64
- The GRDC won the NAB Grant Thornton Risk Management Award category and was a finalist in the Oppeus Governance Award category at the 2009 NAB Agribusiness Awards for Excellence. Page 102
- The tri-annual independent review of the GRDC Board's performance concluded that the GRDC continued to attain a high standard of corporate governance. Page 92
- The GRDC supported 24 Travel Awards, 11 Industry Development Awards, 31 conferences and 50 new training scholarships, including 12 Agricultural Training Awards, 17 Grains Industry Undergraduate Honours Scholarships and 18 Grains Industry Research Scholarships. Page 73
- Over 4,000 people attended the GRDC Research Updates and specialist workshops on topics including frost, precision agriculture, grower strategies and pest control.
- The GRDC administered the management of over 860 projects across 230 organisations, employing approximately 2,500 researchers. Pages 152–178

FIGURE 1:
Grower mood towards the state of the Australian grains industry

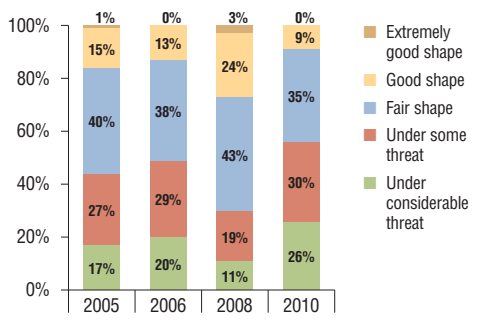
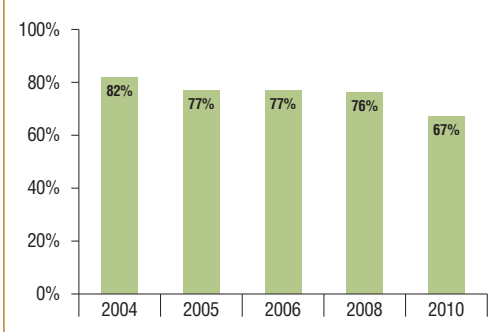


FIGURE 2:
Proportion of surveyed grain growers who feel they have directly benefited from grains research, development and extension activities over the past five years



Highlights of 2009–10

Successes

- The Wheat Classification Council and Variety Classification Panel met expectations and more than 100 varieties were successfully classified.
- The GRDC's Annual Report 2008–09 received a gold award at the Institute of Public Administration Australia ACT awards and a silver award at the Australasian Reporting Awards.
- The GRDC–Australian Bureau of Agricultural and Resource Economics Harvesting Productivity initiative was established, to significantly increase understanding of the drivers and constraints of productivity growth in the Australian grains industry, and to identify where GRDC investments should be targeted to improve industry productivity over the long term. Page 20
- The GRDC led the National Adaptation and Mitigation Initiative in partnership with the Department of Agriculture, Fisheries and Forestry Climate Change Research Program. Page 31
- In partnership with Dairy Australia, Meat and Livestock Australia, the Rural Industries Research and Development Corporation and the Sugar Research and Development Corporation, the GRDC acted as the managing agent for the Managing Climate Variability program. Page 32
- The GRDC was successful in its application for support to continue the mixed farming program Grain and Graze under the Australian Government's Caring for our Country initiative. Page 104

Challenges

The GRDC operates in a rapidly changing grains industry. In 2010–11, the business environment will continue to be influenced by volatility in seasonal conditions and grain prices, which in turn will affect grower profitability.

Ongoing challenges for the GRDC include:

- declining rates of total factor productivity growth in the grains sector
- continued pressure on public funding for RD&E
- climate variability and longer term climate change
- the task of managing the interface between public and private investment in RD&E
- increasing capacity constraints due to demographic factors and competition for RD&E skills from other sectors of the economy
- the continuous need to demonstrate to industry and government the returns on their investments in RD&E.

The completion of the National Grains RD&E Strategy in 2009–10 provided a strategic framework to help address many of these challenges, as well as opportunities. The GRDC played an important role in the development of the strategy, which marked the first occasion on which the major contributors to grains RD&E agreed to a national approach to guide investment decisions.

Other factors that may affect the GRDC's strategies and investment portfolio in 2010–11 include the outcomes of:

- the development of a national strategic rural R&D investment plan, being undertaken by the Australian Government's key advisory body on rural R&D, the Rural Research and Development Council
- a review of the appropriateness of the rural R&D corporation model and, in particular, the economic and policy rationale for Australian Government investment in rural R&D, being conducted by the Productivity Commission.

The GRDC will also continue its focus on improving its operations in areas related to the investment process, business processes, engagement with stakeholders and international alliances.

FIGURE 3:
GRDC income in 2009–10

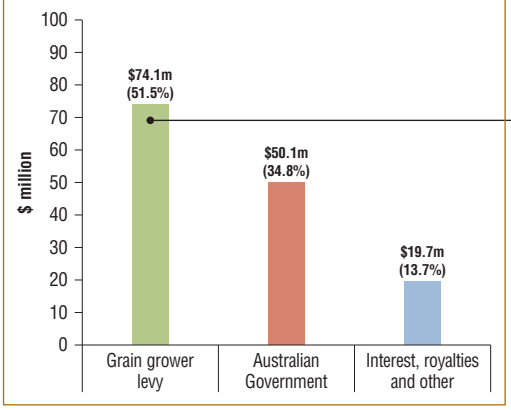
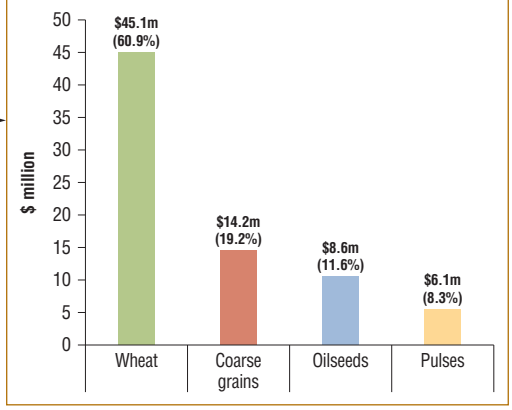


FIGURE 4:
Grain grower levy by crop type in 2009–10



Highlights of 2009–10

TABLE 1:
Five years at a glance

	2009–10		2008–09	2007–08	2006–07	2005–06
GRDC						
Revenue	$143.8m	▼	$150.4m	$127.2m	$98.6m	$116.9m
Expenditure	$133.4m	▲	$121.3m	$102.5m	$118.2m	$127.5m
Operating surplus/(deficit)	$9.8m	▼	$28.5m	$24.1m	($19.8m)	($10.6m)
Total assets	$176.7m	▲	$159.1m	$117.5m	$106.0m	$127.7m
Total equity	$128.5m	▲	$118.7m	$89.7m	$65.6m	$84.1m
Industry contributions	$74.1m	▼	$89.1m	$76.6m	$50.9m	$60.9m
Commonwealth contributions	$50.1m	▲	$43.9m	$37.6m	$35.8m	$43.1m
R&D expenses	$116.8m	▲	$106.3m	$89.1m	$105.6m	$116.1m
Employee benefits	$6.4m	▲	$6.1m	$5.8m	$5.6m	$5.2m
Suppliers	$5.6m	▲	$5.2m	$5.1m	$5.1m	$5.6m
Number of full-time GRDC staff[a]	50	▲	49	47	44	50
Number of projects	868	▲	771	611	680	798
Grains industry						
Estimated number of grain farms[b]	25,139	▼	28,455	28,081	29,000	30,900
Number of grain crops covered by R&D levies	25	—	25	25	25	25
Estimated gross value of production[c]	$8,838m	▼	$10,448m	$10,756m	$5,024m	$8,540m
Total grain production—summer and winter crops ('000 tonnes)[d]	36,925	▼	37,675	29,760	19,204	43,635

a Number of full-time GRDC staff as at 30 June each year.
b Australian Bureau of Agricultural and Resource Economics (ABARE) estimates for the number of broadacre farms planting at least 100 hectares for grain production—from the *Australian Grains* report series, 2006 to 2010. Figures for 2005–06 to 2007–08 restate the estimated numbers of grain farms shown in previous GRDC annual reports in accordance with this new definition of a grain farm. Previous reports defined a grain farm as a broadacre farm planting more than 30 hectares per year for grain production.
c Latest ABARE estimates for the gross value of production (GVP) of grains and oilseeds, excluding rice—from the June 2010 *Australian Commodities* report. Figures for 2005–06 to 2007–08 restate the GVP estimates shown in previous GRDC Annual Reports in accordance with this change to using ABARE data.
d Latest ABARE estimates for total summer and winter crop production, excluding cotton seed and rice—from the June 2010 *Australian Crop Report*.
Note: Figures for the 2005–06 to 2006–07 reporting periods have been restated in accordance with a new accounting policy regarding grant income.

FIGURE 5:
GRDC expenditure in 2009–10

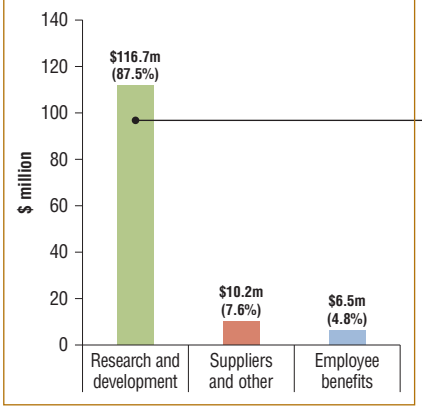
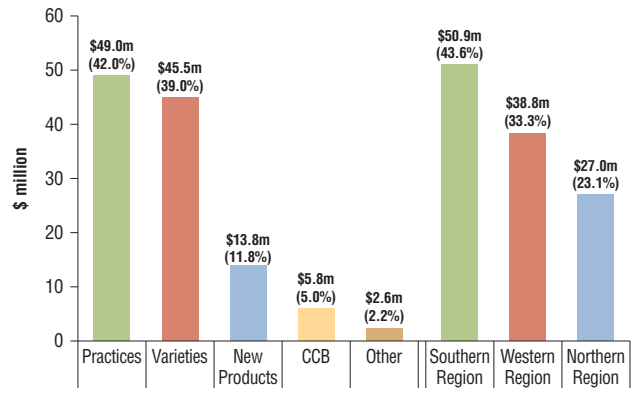


FIGURE 6:
R&D investment by line of business and region in 2009–10



Letter of Transmittal

Australian Government
Grains Research and Development Corporation

GRDC
Grains Research & Development Corporation

15 October 2010

Senator the Hon. Joe Ludwig
Minister for Agriculture, Fisheries and Forestry
Parliament House
CANBERRA ACT 2600

Dear Minister

I have pleasure in presenting the annual report of the Grains Research and Development Corporation (GRDC) for the year ended 30 June 2010, 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).

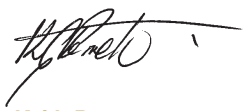
The GRDC is confident that its performance in 2009–10 contributed to the industry's and the government's vision for a profitable, internationally competitive and ecologically sustainable Australian grains industry. This achievement is consistent with the GRDC's responsibility to plan, execute and report against the:

- objects of the PIERD Act as they apply to the GRDC
- planned outcomes of *Prosperity through Innovation*, the corporation's five-year Strategic R&D Plan 2007–12
- outcomes and outputs described in the annual operational plan
- outcome and deliverables described in the portfolio budget statements.

This annual report complies with the planning and reporting requirements prescribed by the CAC Act. GRDC directors are responsible, under section 9 of the CAC Act, for the preparation and content of the report of operations in accordance with the Commonwealth Authorities and Companies (Report of Operations) Orders 2008 (Finance Minister's Orders).

The attached report of operations was made in accordance with a resolution of the corporation's directors on 13 October 2010 and presents fairly the information required by the Finance Minister's Orders.

Yours sincerely



Keith Perrett
Chair

Level 1, 40 Blackall Street, Barton ACT 2600 | PO Box 5367, Kingston ACT 2604 | t. 02 6166 4500 | f. 02 6166 4599 | grdc@grdc.com.au | www.grdc.com.au

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Front cover photos: Paul Matthews

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PART 1

Overview

Canola and wheat crop trials at the Mallee Sustainable Farming Systems site, Kerribee Station, south-west NSW.
Photo: Brad Collis

Purpose

The Grains Research and Development Corporation (GRDC) was established in 1990, under the *Primary Industries and Energy Research and Development Act 1989*, to assist the Australian grains industry to:

- increase the economic, environmental and social benefits to members of primary industries and to the community in general by improving the production, processing, storage, transport or marketing of grain
- achieve sustainable use and management of natural resources
- make more effective use of the resources and skills of the community in general and the scientific community in particular
- improve accountability for expenditure on R&D activities.

The GRDC assists the grains industry by investing in R&D and related activities across a portfolio spanning temperate and tropical cereals, coarse grains, pulses and oilseeds. This involves coordinating and funding the activities; monitoring, evaluating and reporting on their impact; and facilitating the dissemination, adoption and commercialisation of their results.

The GRDC also contributes to the development of strategic national approaches to grains industry R&D, to reduce fragmentation and duplication, and to help address industry-wide issues such as biosecurity and climate change.

Organisational outcome

As part of the Australian Government's Agriculture, Fisheries and Forestry Portfolio, the GRDC delivers one outcome towards the portfolio's goal of achieving more sustainable, competitive and profitable Australian agriculture, food, fisheries and forestry industries:

> New information and products that enhance the productivity, competitiveness and environmental sustainability of Australian grain growers and benefit the industry and wider community, through planning, managing and implementing investments in grains research and development.

Funding

The GRDC is principally funded by a grower levy and Australian Government contributions.

The levy is based on the net farm gate value of the annual production of 25 crops: 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. Farm gate value of production differs from the gross value of production, as farm gate value deducts costs of storage, handling, freight and 'free on board' costs.

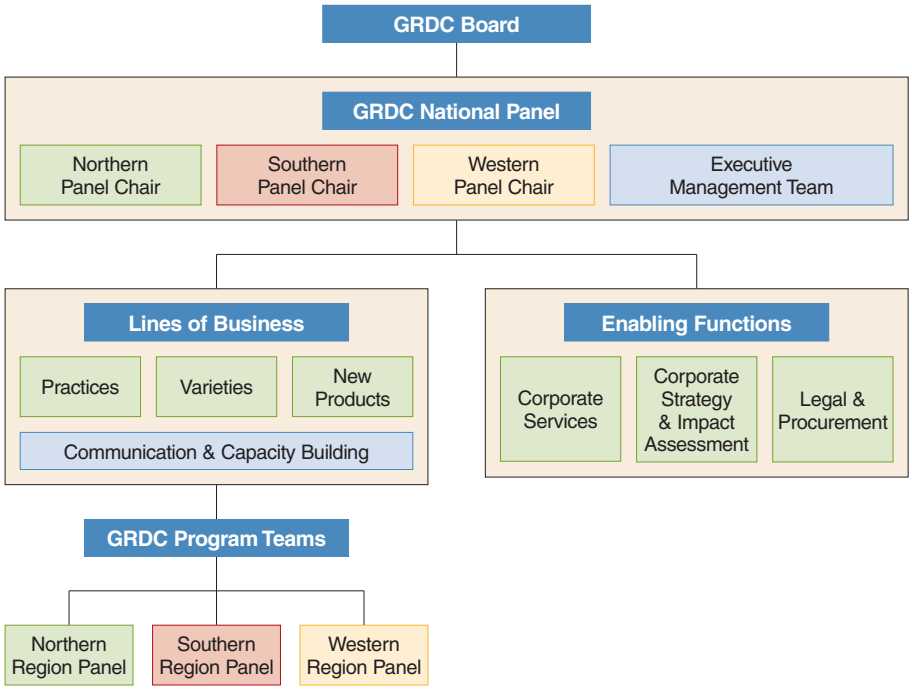
The Australian Government will match the levy up to a limit of 0.5 percent of the three-year rolling average of the gross value of production of the 25 leviable crops.

Phil Eberbach of Charles Sturt University, Wagga Wagga, demonstrates the use of a probe to measure root distribution in a lysimeter to GRDC staff during a research visit in December 2009. *Photo: GRDC*

Structure

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

FIGURE 7:
GRDC structure, 2009–10



Note: For the purposes of performance reporting against the GRDC Annual Operational Plan 2009–10 and *Prosperity through Innovation*, the corporation's five-year Strategic Research and Development Plan 2007–12, each line of business corresponds to an output group. The fourth output group, Communication & Capacity Building, is a combination of communication and capacity-building programs managed within the other three output groups.

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 currently comprises eight Directors: Keith Perrett (Chair), Peter Reading (Managing Director), Nicole Birrell, Colin Butcher, Jenny Goddard, Steve Marshall, Timothy Reeves and Graeme Robertson. More details on the roles and backgrounds of the Board members are provided in Part 3.

Executive Management Team

The Executive Management Team (EMT) has seven members: Peter Reading (Managing Director) and the executive managers from each of the six management groups: Gavin Whiteley (Corporate Services), Leecia Angus (Corporate Strategy & Impact Assessment), Geoff Budd (Legal & Procurement), Stephen Thomas (Practices and Communication & Capacity Building), John Harvey (Varieties and Communication & Capacity Building) and Vince Logan (New Products).

The EMT leads the GRDC's business activities, advises the GRDC Board and implements the Board's decisions. 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.

Information on the roles and backgrounds of the EMT members is provided in Part 3.

Lines of business and enabling functions

At the operational level, the GRDC's organisational structure is divided into three lines of business, described as 'output groups' for performance reporting purposes: Practices, Varieties and New Products. A fourth output group, Communication & Capacity Building, delivers the outputs of the communication and capacity-building programs that are managed within the three lines of business.

In alignment with the Department of Agriculture, Fisheries and Forestry's planning and reporting approach, the output groups are referred to as 'sub-programs' for the purposes of the portfolio budget statements for 2009–10.

The lines of business are supported by three enabling functions: Corporate Services, Corporate Strategy & Impact Assessment, and Legal & Procurement.

Advisory panels and program teams

The Board makes decisions with the support of the National Panel, informed by the knowledge and experience of three regional panels and three program teams. This network helps to ensure that GRDC investments are directed towards the interests of all its stakeholders and the strategic objectives of its programs.

Regional panels

The three regional advisory panels, covering the northern, southern and western grain-growing regions of Australia, are composed of grain growers, agribusiness representatives, researchers and the GRDC's executive managers, with provision for other industry experts to participate as appropriate. Panel members are contracted to carry out their role and are not employees of the GRDC.

The regional panels develop and monitor regional investment priorities for their regions, identify investments that respond to the national priorities of grain growers and the Australian Government, and make recommendations to the National Panel. They work closely with grower groups and organisations and interact formally with local research advisory committees, which refer research issues to the panels.

The GRDC is a leading member of the committee developing the Primary Industries Ministerial Council's research, development and extension (RD&E) framework, and has contributed significantly to formulating the national strategy for the grains sector. The GRDC regional panels have provided data about regional RD&E capacity and strategic needs to inform the national strategy.

Figure 8 provides an overview of the geographical, environmental and agricultural characteristics of the three grain-growing regions.

National Panel

The National Panel comprises the three regional panel chairs, the GRDC's Managing Director and the GRDC's executive managers.

The National Panel addresses national R&D priorities across the GRDC's investment portfolio, takes advice from program teams and advances recommendations to the Board. The National Panel also assists the Board to maintain links with grain growers, the Australian Government, state and territory governments and research partners.

Program teams

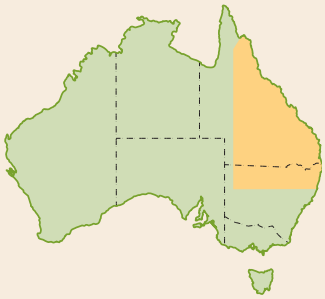
The GRDC has three program teams, each composed of program managers, members from each regional panel, an executive manager and a panel chair. Depending on the size and complexity of the portfolio, some program teams cover several subprograms.

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

Spring tours provide an opportunity for the Board, panel members and staff to visit different regions and meet with growers. The National Panel Spring Tour in October 2009 included a visit to AgVance Farming Pty Ltd in Quirindi NSW. (From left) Neil Young, Western Region Panel Chair; Peter McKenzie, AgVance; James Clark, Northern Region Panel Chair; Steve Thomas, Executive Manager Practices; Leecia Angus, Executive Manager Corporate Strategy and Impact Assessment; Vince Logan, Executive Manager New Products; Peter Reading, Managing Director; David Shannon, Southern Region Panel Chair; Gavin Whiteley, Executive Manager Corporate Services; and Geoff Budd, Executive Manager Legal and Procurement. *Photo: Marilyn Carter, AgVance Farming Pty Ltd*

FIGURE 8:
Characteristics of the GRDC regions

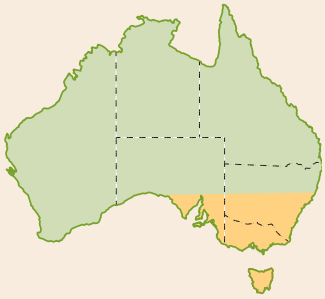
NORTHERN REGION



- tropical and subtropical climate
- high inherent soil fertility
- yield dependency upon conservation of soil moisture from subtropical rainfall
- large winter and summer cropping enterprises
- diversity in crop choice
- need for better-adapted pulses
- premium high-protein wheats for export and domestic markets
- high potential yields
- competition with cotton
- feed grains for livestock

Grower Paul McNulty and the DPIF Qld's Bede O'Mara inspecting phosphorus trials. *Photo: Mandie O'Shea*

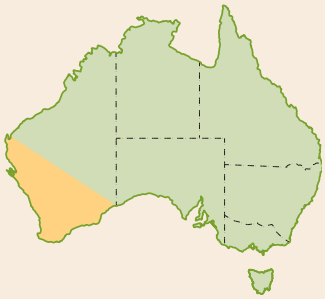
SOUTHERN REGION



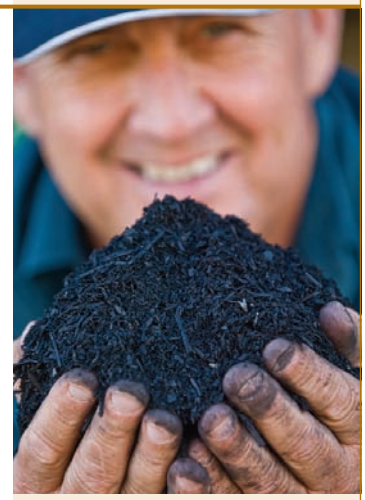
- temperate climate
- relatively low soil fertility
- yield dependency upon reliable spring rainfall
- smaller mixed farming enterprises involving winter cropping and livestock production
- diverse production patterns and opportunities
- large and diverse domestic markets
- phase farming innovation
-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

Michael Laws, a frost researcher at the University of Adelaide, checks Australian barley lines crossed to frost-tolerant Japanese lines.

WESTERN REGION



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



Grower Ian Stanley with biochar made from wheat straw. *Photo: Evan Collis*

Planning and reporting approach

The GRDC is a statutory corporation, operating as a research investment body on behalf of Australian grain growers 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 2008. The GRDC is a portfolio agency of the Australian Government Department of Agriculture, Fisheries and Forestry.

Table 2 shows the elements of the approach the GRDC adopts to meet its corporate planning and reporting obligations as a statutory corporation.

In line with the corporation's enabling legislation, the GRDC Board communicates its strategic directions and performance objectives through a five-year strategic R&D 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 GRDC's Strategic R&D Plan 2007–12, *Prosperity through Innovation*, took effect from July 2007. The plan provides a framework for investment and delivery of outputs and outcomes that will address the Australian Government's National Research Priorities and Rural R&D Priorities, as well as the priorities of Australian grain growers, over the 2007–12 period. These priorities, and the GRDC's achievements in meeting them in 2009–10, are discussed in more detail in Part 2.

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. This annual report details the GRDC's achievements against its planned outputs set out in the GRDC Annual Operational Plan 2009–10 and its planned outcome identified in the 2009–10 portfolio budget statements. The output groups used for reporting purposes correspond to the three lines of business and the communication and capacity-building programs that underpin the GRDC's business strategy and operations.

The corporation uses the Australian National Audit Office *Better Practice Guide: Public Sector Governance* to assess its overall approach and ongoing development. The GRDC's corporate governance in 2009–10 is discussed in detail in Part 3.

The GRDC's drivers for action, corporate and output group objectives, strategies and future directions are summarised in Figure 9.

TABLE 2:
Elements of the planning and reporting approach

Element	Purpose
Strategic R&D plan	Sets out the GRDC's high-level goals, strategies and performance measures for a five-year period, developed in consultation with stakeholders and approved by the Minister
Annual operational plan	Specifies the annual budget, resources and research priorities that give effect to the strategic R&D plan during a given financial year
Annual report	Provides information on R&D activities and their performance in relation to the goals set in the annual operational plan and portfolio budget statements for a given financial year
Stakeholder report	Meets legislative requirements for reporting to the grains industry's representative organisation, the Grains Council of Australia
Growers' report	Provides performance information to growers on R&D activities for a given financial year
Annual procurement plan	Makes procurement information publicly available through the Australian Government's AusTender procurement management website
Investment plan	Informs potential research partners about some of the GRDC's new investment priorities for the next financial year and invites interested parties to submit research proposals
Portfolio budget statements	As part of the Australian Government budget process, summarises the planned deliverables, outcomes, performance information and financial statements for a given financial year

FIGURE 9:

Overview of the GRDC performance framework 2009–10

Role of the GRDC described in the objects of the *Primary Industries and Energy Research and Development Act 1989* **Refer page 2**	Australian grain grower priorities **Refer pages 22–24**	Australian Government: National Research Priorities **Refer pages 24–30**	Australian Government: Rural R&D Priorities **Refer pages 24–30**	Australian Government: Minister's R&D Priorities **Refer pages 24–30**

Prosperity through Innovation: **Strategic Research and Development Plan 2007–12**	**Annual Operational Plan 2009–10**	**Portfolio Budget Statements 2009–10**

Corporate objective	Australian grain growers effectively competing in global grain markets			
Corporate strategies	Coordinate a national grains R&D agenda and portfolio	Deliver against Australian Government priorities	Grow and leverage total grains R&D investment	Ensure R&D is market-driven
Performance indicators/ outputs	**Refer page 14**	**Refer page 15**	**Refer page 15**	**Refer pages 15–16**
Objectives	**Output Group 1—Practices** Better practices developed and adopted faster	**Output Group 2—Varieties** Growers have access to superior varieties that enable them to effectively compete in global grain markets	**Output Group 3—New products** Deliver new products and services (both on farm and off farm) that will assist growers to effectively compete in global grain markets	**Output Group 4—Communication & Capacity Building** Increase the awareness and capacity to optimise adoption of grains research outputs
Strategies	• Identify and develop profitable, innovative and integrated practices and technologies • Ensure active grain grower involvement and commitment • Undertake targeted extension and adoption through appropriate delivery channels • Enhance sustainable management of natural resources	• Build and sustain world-leading breeding programs • Focus pre-breeding research on key traits • Develop a path to market for genetically modified crops • Facilitate faster adoption of superior varieties	• Identify national and international technology relevant to the grains industry • Develop partnerships to deliver new technology • Undertake product development to meet market requirements • Build robust business cases—demonstrate stakeholder return on investment	• Ensure planned, targeted, measured communication • Coordinate a national approach to building industry and research capacity • Leverage delivery through partnerships • Develop demand-driven publications and products
Performance indicators/ outputs	**Refer pages 46–48**	**Refer pages 59–60**	**Refer pages 67–69**	**Refer pages 77–79**

Outcome	New information and products that enhance the productivity, competitiveness and environmental sustainability of Australian grain growers and benefit the industry and wider community, through planning, managing and implementing investments in grains research and development.
Future	The GRDC be recognised as a leader in setting, coordinating and facilitating a national grains R&D agenda driven by market signals that would enable grain growers to compete on world markets, and deliver against Australian Government priorities.

Report from the Chair and Managing Director

The year 2009–10 was another very challenging one for the Australian grains industry. Seasonal conditions were again variable across much of the grain belt and prices were negatively impacted by increasing global stocks and the high value of the Australian dollar. These factors, together with relatively high input prices, continued to negatively affect farm profitability.

Australia's grain growers deserve to be congratulated on the success they have achieved under these difficult circumstances. The grains industry performs well above the average across the broadacre farming sector, in terms of both cash income and total factor productivity. Growers' willingness to embrace the best practices, varieties, products and information available, to improve both the profitability and the sustainability of their enterprises, is an important factor in this success.

The GRDC plays a vital role in delivering the tools that growers need to meet the challenges of their business environment, through its four output groups: Practices, Varieties, New Products and Communication & Capacity Building.

The GRDC's Strategic R&D Plan 2007–12, *Prosperity through Innovation*, clearly defines the strategies and expected performance indicators for the output groups. This annual report covers the third year of implementation of the five-year strategic plan.

Most of the planned outputs and key performance indicators are tracking in line with the five-year plan targets. This annual report provides specific details on progress against the performance indicators for each of the output groups, and shows how performance objectives are aligned to industry and government priorities.

To achieve its objectives, it is essential that the GRDC continues to work closely and collaboratively with industry and government, and with its R&D partners, to help ensure that the total grains RD&E effort is optimised and focused on delivering a productive, profitable and sustainable grains industry.

The outcomes of 2009–10 and major challenges for 2010–11 are covered in detail in other sections of the annual report. We will take this opportunity to highlight some of the achievements of 2009–10 and challenges for the year ahead.

(From left) Mark Sweetingham, WA Department of Agriculture and Food Director Grain Industries Development, Peter Reading, GRDC Managing Director, and Terry Redman, WA Minister for Agriculture and Food, at the GRDC offices in June 2010. *Photo: GRDC*

Keith Perrett
Chair

Peter Reading
Managing Director

Grains industry production in 2009–10

The production of winter grains and oilseeds in 2009–10 was 35.2 million tonnes, an increase of 2.5 percent in comparison to production in 2008–09.[1]

Summer crop production in 2009–10 was 1.7 million tonnes. This shows a drop of 48.6 percent compared to the previous year's production, due primarily to a 54 percent reduction in sorghum production.

Overall, in 2009–10 grains industry production was 36.9 million tonnes with an estimated gross value of production of $8.8 billion.

GRDC achievements in 2009–10

The GRDC was involved in some major achievements for the grains industry during the year, at all levels from strategy to service delivery.

National Grains RD&E Strategy

To provide an effective framework for managing increasing pressures on RD&E budgets and the need to continually optimise investments and demonstrate returns on investments to stakeholders, the GRDC played a key role in the development of the National Grains RD&E Strategy, which was completed in 2009–10 pending endorsement by the Primary Industries Ministerial Council (PIMC).

The strategy was developed by the GRDC, the Department of Agriculture, Fisheries and Forestry, state departments of agriculture, CSIRO, universities, and grower representatives nominated by the Grains Council of Australia.

The strategy sets out a plan to build a highly efficient national grains RD&E sector that contributes to a profitable, competitive and sustainable grains industry, with spillover benefits to the broader agricultural sector, the food manufacturing industry and the Australian community.

The plan focuses on five strategic principles:

- build on existing collaboration
- devise more effective relationship models for engagement between public and private sector investments in RD&E
- implement agency roles within the 'Major—Support—Link' outline of the National Primary Industries RD&E Framework
- develop a national capability-building plan to secure the intellectual and human capital and physical resources required to underpin future RD&E and industry innovation
- develop a mechanism for regular review and alignment of government and industry objectives and agencies on priorities and resource allocation under the National Grains RD&E Strategy.

The strategy both highlights grains industry RD&E priority issues and describes how those issues will be addressed nationally, regionally and locally by the various agencies that play 'major', 'support' or 'link' roles in achieving the desired results. The plan also recommends improved mechanisms for industry engagement.

By increasing cooperation between investors and providers and sharing of capability across the grains industry, the strategy will help to ensure that RD&E programs deliver benefits to growers, industry and government stakeholders.

Wheat classification

The Wheat Classification Council and Variety Classification Panel met expectations and more than 100 varieties were successfully classified. The council also made recommendations, based on industry feedback, on how wheat variety classification can be structured and funded into the future.

Practices

GRDC-supported programs:

- implemented forecasting systems for stripe rust and wheat streak mosaic virus in Western Australia and blackspot in field peas in Western Australia and South Australia
- prepared information packages on disease resistance, ready for incorporation into integrated pest management of sclerotinia and white rust in canola
- completed a baseline survey of farming management practices across agroecological zones, to enable the development of targeted extension programs for each region
- developed plans for national integrated weed management and integrated pest management programs.

1 The figures reported in this section update the figures shown in last year's annual report, which were based on the latest estimate available at the time of publication.

Varieties

The breeding programs released four varieties of wheat, three varieties of oats, four varieties of pulses (two chickpeas and two lentils), and one variety of broad bean.

National Variety Trials showed that new wheat and barley varieties respectively yielded up to 12 percent and 16 percent more than the current dominant varieties with comparable quality and disease resistance.

New Products

GRDC-supported work to develop new products to assist the grains industry saw:

- the launch of JumpStart®, a growth-enhancing phosphorus solubilisation product for use on cereals and canola
- progress in the development of yield-enhancing traits in wheat
- field testing of the advanced prototype of the Harrington Weed Seed Destructor.

Communication & Capacity Building

More than 4,000 people attended the GRDC Research Updates and specialist workshops on topics including frost, precision agriculture, grower strategies and pest control.

The GRDC website was upgraded and the reports of more than 11,000 R&D projects commenced publication on the site. The GRDC also:

- published 26 fact sheets, six supplements, seven research reports and two technical media articles
- supported 24 Travel Awards, 11 Industry Development Awards, 31 conferences and 50 new training scholarships, including 12 Agricultural Training Awards, 17 Grains Industry Undergraduate Honours Scholarships and 18 Grains Industry Research Scholarships.

Governance

The tri-annual review of the performance of the GRDC Board, conducted by Blake Dawson, concluded that the GRDC continued to attain a high standard of corporate governance.

External and internal financial analysis of GRDC projects showed benefit to cost ratios ranging from 2.3:1 to 13:1.

The GRDC was the winner of the NAB Grant Thornton Risk Management Award category and a finalist in the Oppeus Governance Award category at the 2009 NAB Agribusiness Awards for Excellence. The GRDC's Annual Report 2008–09 received a gold award at the Institute of Public Administration Australia ACT awards and a silver award at the Australasian Reporting Awards.

Challenges going forward

The grains industry environment in which the GRDC operates continues to change rapidly. The business environment in 2010–11 will continue to be influenced by volatility in seasonal conditions, grain prices and other impacts on grower profitability.

The GRDC will continue to drive the implementation of the 2007–12 Strategic R&D Plan, *Prosperity through Innovation*, ensuring that the planned outputs are delivered to industry.

The rural R&D corporations (RDCs) are currently being reviewed by the Productivity Commission. The GRDC welcomes this review and actively supports ways to improve the R&D investment model in Australia.

We will also place a major emphasis on working with our R&D partners, federal, state and territory governments and industry to implement the National Grains RD&E Strategy, to identify and prioritise issues and develop and deliver RD&E outcomes for Australian grain growers and the broader community.

The GRDC's achievements depend on the cooperation of the Board, panel members and staff, and strong relationships with growers, industry and research partners. The GRDC will continue to collaborate with other RDCs, federal, state and territory governments, and research partners. We thank them for their contributions to grains industry R&D in 2009–10.

Keith Perrett
Chair

Peter Reading
Managing Director

Significant events

One of the GRDC's reporting requirements under section 15 of the CAC Act is to notify the responsible minister of significant events. Table 3 lists significant events of which the GRDC notified the Minister for Agriculture, Fisheries and Forestry during 2009–10, as well as the dates on which the Minister made announcements or decisions of particular significance to the GRDC.

TABLE 3:
Significant events, 2009–10

Date	Event
17 August 2009	The Hon. Tony Burke, MP, Minister for Agriculture, Fisheries and Forestry, wrote to the GRDC Chair advising action to be taken pending the wind-up of the Grains Council of Australia.
18 August 2009	The Minister wrote to the GRDC to confirm that it was not necessary to replace resigned board member Jeanette Long and therefore the selection committee would not commence selection action.
25 September 2009	The GRDC Chair wrote to the Minister seeking in-principle approval of the GRDC's proposed bargaining position for developing an enterprise agreement.
20 October 2009	The Minister approved the GRDC's Annual Report 2008–09 for tabling. The report was tabled in parliament on 24 November 2009.
13 November 2009	The Minister advised in-principle agreement to the GRDC's proposed bargaining position for developing an enterprise agreement.
9 February 2010	The Minister wrote to the GRDC Chair outlining government priorities to be addressed in the Annual Operational Plan 2010–11.
22 April 2010	The GRDC submitted the Annual Operational Plan 2010–11 to the Minister for approval.
7 June 2010	The Hon. Lindsay Tanner, MP, Minister for Finance and Deregulation, approved operating losses budgeted by the GRDC for 2010–11.

Wheat harvesting. *Photo: Paul Matthews*

Developments since the end of the financial year

When the GRDC Board approved this annual report on 13 October 2010:

- there had been no significant changes in the state of affairs of the GRDC since the end of the financial year
- there had been two significant events since the end of the financial year:
  - Grain Producers Australia became successor to the Grains Council of Australia (GCA) maintaining the same Australian Business Number and performing the legislative roles and prescribed functions previously undertaken by the GCA
  - the Hon. Tony Burke, MP, had been replaced as the Minister for Agriculture, Fisheries and Forestry by Senator the Hon. Joe Ludwig, along with the new Parliamentary Secretary for Agriculture, Fisheries and Forestry, the Hon. Mike Kelly, MP
- no significant changes in the operations of the GRDC were expected.

Kylie Paulsen, GRDC Manager Communications, and Mike Kelly, Parliamentary Secretary for Agriculture, Fisheries and Forestry.
Photo: FRDC

PART 2

Our Performance

Photo: Nicole Baxter

Corporate performance

The GRDC's corporate performance is assessed on the basis of formal surveys and analysis. It is measured against the corporate strategies and performance indicators established in the Strategic R&D Plan 2007–12, *Prosperity through Innovation*; the Annual Operational Plan 2009–10; and the 2009–10 Portfolio Budget Statements for the Department of Agriculture, Fisheries and Forestry.

This section describes the GRDC's corporate performance in 2009–10, in terms of:

- evidence of effective implementation of the corporate strategies set out in the Strategic R&D Plan 2007–12
- feedback obtained through interviews with 1,201 grain growers, as part of the GRDC's biennial grower survey
- results of the impact assessments of eight R&D project clusters, conducted by independent consultants
- findings on farm financial performance and total factor productivity in the grains industry, collated through regular surveys by the Australian Bureau of Agricultural and Resource Economics (ABARE)
- results of the first year of information gathering under the GRDC–ABARE Harvesting Productivity initiative.

The details of the performance of each output group against established performance indicators and targets are shown in the output group sections of Part 2.

Corporate strategies

Table 4 provides examples of how the GRDC progressed against its performance measures for 2009–10 and its objectives and strategies for 2007–12.

TABLE 4:
Corporate overview

Indicator	Performance
Strategy: Coordinate a national grains R&D agenda and portfolio	
Significant evidence of the GRDC taking a lead role in coordinating and facilitating a national grains R&D agenda, which has major impact on grower profitability and sustainability	The GRDC: • played a leading role in the development of the National Grains Research, Development and Extension (RD&E) Strategy • was an active participant in the Climate Change Research Strategy for Primary Industries, which provides a framework for coordination of climate change R&D across the agricultural sector • provided the leadership for implementing specific programs under two initiatives of the Department of Agriculture, Fisheries and Forestry—Caring for our Country, and Australia's Farming Future • continued to have responsibility for the change process of wheat variety classification, following deregulation of the export wheat market • continued to work with industry to streamline end point royalty (EPR) collection systems. In addition, the GRDC made submissions to: • the house of Representatives Standing Committee on Industry, Science and Innovation inquiry into Australia's international research collaboration • the Rural R&D Council on the development of its investment plan (and participated in council workshops) • the National Climate Change Adaptation Research Facility on the development of a national climate change adaptation research plan for primary industries • the Productivity Commission inquiry into Australia's wheat export marketing arrangements and the role of Wheat Exports Australia.
Key GRDC investments demonstrate national coordination with research partners	Examples of key investments in which the GRDC played a national coordinating role include: • the Australian Winter Cereals Pre-Breeding Alliance • the National Brassica Improvement Program • Pulse Breeding Australia • the alliance with the International Maize and Wheat Improvement Center (CIMMYT) • the alliance with the International Center for Agricultural Research in the Dry Areas (ICARDA).

TABLE 4:

Corporate overview *(continued)*

Indicator	Performance
Strategy: Deliver against Australian Government priorities	
Ongoing endorsement by the Minister for Agriculture, Fisheries and Forestry on meeting the Australian Government priorities	The GRDC's Strategic R&D Plan 2007–12 was approved by the Minister for Agriculture, Fisheries and Forestry on 7 July 2007. The GRDC's investments in 2009–10 addressed the Australian Government's: • National Research Priorities—an environmentally sustainable Australia, promoting and maintaining good health, frontier technologies for building and transforming Australian industries and safeguarding Australia. • Rural R&D Priorities—productivity and adding value, supply chain and markets, natural resource management, climate variability and climate change, biosecurity, innovation skills, and technology. • Minister's R&D Priorities—productivity improvement, maintaining and improving international market access opportunities, value chain effectiveness and efficiency, sustainable environmental resource management, climate change, biosecurity, workforce, skills, education, diversity, collaboration and evaluation.[a]
Strategy: Grow and leverage total grains R&D investment	
Significant evidence of leveraging total grains R&D investment	The GRDC continued to act as a catalyst in growing and leveraging total grains R&D investment in Australia. For example, for every dollar the GRDC invested: • in the oilseed breeding program, it leveraged $3.0 from research partners • in the grain storage program, it leveraged $1.7 from research partners • in the weeds management program, it leveraged $1.4 from research partners • in the Australian Winter Cereals Molecular Marker Program, it leveraged $1.3 from research partners • in the crop nutrition program, it leveraged $1.4 from research partners • in the soil biology program, it leveraged $1.0 from research partners • in the Premium Grains for Livestock Program, it leveraged $0.9 from research partners. Other examples of the GRDC's leveraging include investments in wheat breeding, pulse breeding and Novozymes Biologicals Australia Pty Ltd.
Strategy: Ensure R&D is market-driven	
Significant evidence of market signals being taken into account in R&D investments	The GRDC considered grower R&D needs and priorities in detail while developing the annual operational plan. This was assisted by interaction between the GRDC's three regional panels and growers, advisers and researchers. In addition, the GRDC sought direction from the grains industry's formal representative organisation, the Grains Council of Australia, regional advisory committees and link groups. These processes ensure that investments are designed to meet the needs of growers and the wider Australian grains industry. The GRDC structure and processes ensure engagement with the supply chain by: • engaging representatives from various parts of the supply chain as GRDC panel members • drawing on the Managing Director's direct experience in grain marketing • liaising with supply chain members through the GRDC panels and regional agribusiness reference groups. For investment where there will be significant benefit for supply chain participants, the GRDC seeks contributions from those expected to benefit. The contributions help the GRDC to establish that the particular project is definitely needed and the involvement of supply chain participants helps to keep investments on track, highly relevant and likely to produce outputs that will be adopted.

a Table 12 shows examples of how GRDC-supported projects addressed Australian Government priorities; Appendix A details how GRDC investment dollars were apportioned to meet Australian Government priorities.

TABLE 4:

Corporate overview *(continued)*	
Indicator	**Performance**
***Strategy:* Ensure R&D is market-driven**	
Significant evidence of market signals being taken into account in R&D investments *(continued)*	Examples of 2009–10 projects in which the GRDC worked with co-investors from the supply chain include: • the grain hygiene program of the Cooperative Research Centre for National Plant Biosecurity, with bulk grain accumulators and grain exporters • Go Grains Health & Nutrition Limited, with food manufacturers, food research organisations and the representative body for food, drink and grocery manufacturing • the feed grain partnership for sorghum, with three R&D corporations from the livestock sector • the development of a new baking process for Asia, with leading international bakeries • the project to produce Australian wheat for China, with international millers • research on the biochemistry and genetics of protein modification and fermentability of malting barley, with the Australian malting industry • work to streamline the collection of end point royalties, with breeders and seed industry participants • significant interaction with and support for grains industry bodies, including Pulse Australia, Barley Australia and the Australian Oilseeds Federation.

Grower survey

The GRDC's Strategic R&D Plan 2007–12, *Prosperity through Innovation,* sets out key performance indicators (KPIs) for each of the four output groups. Many of the KPIs are based on the perceptions and activities of grain growers—such as their uptake of new grain varieties and adoption of new farm management practices and technologies. Regular surveys seeking grain grower feedback on GRDC performance are an important assessment tool used by the GRDC to measure its performance against these KPIs.

The GRDC Grower Survey 2010 was the second of three biennial surveys to be conducted (in 2008, 2010 and 2012) under the Strategic R&D Plan 2007–12. The survey results in Table 5 present the GRDC's track record of achievement against selected KPIs over the period from 2004 to 2010. The 2010 results are based on 1,201 computer-assisted telephone interviews with grain growers across Australia, covering the GRDC's three production regions and key agroecological zones.

TABLE 5:

GRDC performance against selected key performance indicators, by proportion of growers surveyed (percent)

Key performance indicator	2004	2005	2006	2008	2010
Growers rating GRDC performance very or fairly high	68	72	71	68	69
Growers directly benefiting from grains R&D activities or initiatives in the past five years	82	77	77	76	67
Growers confident that grains R&D is addressing threats to long-term sustainability of their farm	76	76	76	73	70
Growers adopting actions to ensure longer term sustainability of farm	92	88	89	86	89
Growers adopting actions to ensure longer term sustainability of farm as a result of GRDC-specific activities or initiatives	40	40	45	40	49
Grower awareness of regional panels	42	50	58	55	60
Growers having direct contact with regional panel members	16	20	23	23	23

Note: The survey was suspended in 2007 as part of the GRDC's drought response and is now conducted every second year.
Source: GRDC Grower Surveys, 2004 to 2010.

In 2010, the majority of growers surveyed (69 percent) rated the GRDC's overall performance highly, maintaining the grower approval rating of around 70 percent achieved since 2004. Sixty-seven percent of growers felt that they were directly benefiting from grains industry RD&E activities undertaken in the past five years (down from 76 percent in 2008), while 70 percent of growers were confident that grains R&D is addressing threats to the long-term sustainability of their farms (down from 73 percent in 2008). Sixty percent of growers were aware that the GRDC has regional panels in place (up from 55 percent in 2008), and 23 percent said they had direct contact with panel members in their region (unchanged from 2008).

The survey found that growers were less positive about the current state of the Australian grains industry than they had been in 2008. Less than half (44 percent) described the industry as being in 'extremely good', 'good' or 'fair' shape (down from 70 percent in 2008), while the majority (56 percent) felt the industry was under some or considerable threat (up from 30 percent in 2010).

More results are provided in the grower survey snapshots in the reports on performance for the Practices and Varieties output groups.

A separate survey conducted by the *Stock Journal* newspaper in 2009–10 asked South Australian farmers to rate the performance of the GRDC and two other rural R&D corporations (RDCs) on a scale from 1 (poor) to 5 (excellent). The GRDC scored 3.44 out of 5, with no respondents rating the organisation poorly and 37 percent rating its performance as good. The results indicate that the majority of South Australian farmers surveyed support the GRDC and think it is doing a good job overall.

Impact assessments

The GRDC undertook impact assessment studies of eight clusters of projects in 2009–10 as part of the core business process 'to evaluate the impact of its R&D and report to stakeholders'. The studies assessed the economic, social and environmental benefits arising from GRDC investments. They were undertaken through an independent consultant, in accordance with the guidelines developed by the Council of Rural Research and Development Corporation Chairs.

Table 6 summarises the costs and benefits of the project clusters in dollar terms, while Table 7 summarises the economic, environmental and social benefits of the project clusters.

TABLE 6:
Financial benefits identified by impact assessments

Project cluster	Benefits $m (1)	Costs $m (2)	Benefit to cost ratio (1/2)	Net value $m (1–2)
Australian winter cereals molecular markers	175.8	17.2	10:1	158.7
Crop nutrition	61.5	8.6	7.2:1	52.9
Grain storage	77.3	6.0	13:1	71.2
Oilseeds breeding	57.3	12.7	4.5:1	44.5
Premium grains for livestock	34.8	7.3	4.8:1	27.5
Soil biology	42.4	10.5	4.0:1	32.0
Summer coarse grains breeding	11.4	5.0	2.3:1	6.4
Weeds management	57.5	16.5	3.5:1	41.0

Note: Dollar amounts are calculated in present value terms.

TABLE 7:

Economic, environmental and social benefits identified by impact assessments

Economic benefits	Environmental and social benefits
Australian winter cereals molecular markers	
• An increased rate of genetic gain in wheat and barley • Intellectual property generated for state agencies, universities and private breeding companies	• Reduced chemicals in the farm and community environment • Increased molecular biology capacity in the scientific community • Better matching of consumer needs
Crop nutrition	
• Increased profitability of crop production from application of fertilisers • Increased value of nutrients in waste streams through improved recovery and crystallisation processes	• Reduced greenhouse gas emissions and reduced contamination of ground and surface waters due to reduced applications of nitrogen fertiliser • Reduced contamination of surface water and sediment with phosphorus • Potential for sequestering increased amounts of carbon in cropping • The maintenance of a rural workforce population due to a more profitable cropping sector
Grain storage	
• A reduction in grain storage costs due to greater longevity of phosphine and grain protectants • Reduced yield losses and a reduced quantity of weather-damaged grain • A higher level of cost-effective investment in on-farm storage infrastructure and on-farm storage practice • The continued maintenance of international market status	• More efficient phosphine use reducing the potential health impact to fumigators • Enhanced skills and capacity in entomology and taxonomy • Reduced likelihood of chemical residues in stored feed grain • Consumers continuing to receive grain free of insects and chemical residues
Oilseeds breeding	
• Yield increases to canola and soybean growers • Reduced chemical usage on farms • Lower costs of production by maintaining canola in crop rotations • Yield increases to cereal growers from maintenance of oilseeds in crop rotations via provision of a disease break • Reduced fertiliser costs from nitrogen supplied by soybeans in rotations • Yield increases to sugarcane growers from maintenance of oilseeds in crop rotations	• Reduced chemical usage on farms and fertiliser usage by sugarcane producers • Reduced export of chemicals and nutrients to public waterways • Improved farmer wellbeing from reduced chemical use • Potential health benefits from high-oleic canola oils
Premium grains for livestock	
• Potential to reduce cost of production in intensive animal industries • Feed grain trading prices reflect their true use value including domestic and export prices • Potential for higher quality feed grain cultivars developed with implications for higher quality feed grains produced in the future • Potential for overseas licensing of calibrations providing a revenue stream to Australia	• Increased feed grain industry capacity • Potential to reduce the carbon footprint in intensive animal industries

TABLE 7:

Economic, environmental and social benefits identified by impact assessments *(continued)*

Economic benefits	Environmental and social benefits
Soil biology	
• Increased profits from higher yields resulting from more efficient use of fertilisers • Reduced wastage costs and reduced disease control costs, and potential export markets for inoculants	• More sustainable agriculture from reduced reliance on manufactured and mined fertilisers • Reduced fungicide use in the farm environment • Potential use of natural inoculants to reduce reliance on manufactured fertilisers • Reduced off-farm export of nutrients and fungicides
Summer coarse grains breeding	
• Yield increases and reduced yield variability for sorghum growers generally and for Atherton Tableland maize growers • Reduced costs of insecticides	• Increased resilience of rural communities from more drought-tolerant varieties • Reduced off-farm export of insecticides • Improved farmer wellbeing through avoidance of chemical use • Increased industry research capacity through coordination of a national program
Weeds management	
• Increased profits from higher yields • Reduced costs resulting from more effective weed control strategies	• More sustainable agriculture from maintaining the viability of low-till cropping • Reduced herbicide use • Reduced off-farm export of nutrients and herbicides • Increased industry research capacity resulting from better coordinated national research • Increased national capacity in weeds policy • Improved international scientific collaboration and capacity building

Photo: C. Nicholls, Hot Tin Roof Communications

Farm performance

This section looks at farm financial performance and productivity growth in the grains industry to assess the industry-wide impact of the GRDC's corporate strategies.

In order to monitor farm performance and productivity trends in the grains industry and other broadacre industries, the GRDC—along with other RDCs and the Department of Agriculture, Fisheries and Forestry—funds a range of surveys and analytical research conducted by ABARE, in particular its annual *Australian Agricultural and Grazing Industries Survey* (AAGIS). The results presented below for farm financial performance and industry productivity trends draw heavily from the AAGIS results.

Financial performance

ABARE's latest farm financial performance results indicate that the financial performance of grains-producing farms, which include cropping specialists and mixed crop–livestock farms, declined in 2009–10, as a result of lower grain and oilseed prices together with reduced grains production in New South Wales and Queensland that was not offset by higher production in Victoria and South Australia.

Total cash receipts from grain crops of $503,100 per farm in 2009–10 were around $48,000 or 9 percent lower than the $551,000 in cash receipts achieved in each of the previous two years. Total cash costs in 2009–10 fell slightly to $410,000 because of lower fertiliser expenditure—the largest cost item for grains-producing farms—and reduced interest payments on farm debt. As a result, average farm cash income was $93,000 per farm in 2009–10, down 27 percent from $126,600 in 2008–09 and around 20 percent below the average for the previous ten years.

Nevertheless, grains-producing farms continued to record higher average farm cash incomes in 2009–10 than other broadacre industries. Average farm cash incomes in 2009–10 were $132,000 for cropping specialist farms; $65,000 for mixed crop–livestock farms; $64,000 for sheep–beef farms; $57,000 for sheep farms; and $26,000 for beef farms.

Total factor productivity

Total factor productivity (TFP) measures outputs relative to total inputs used to produce the output. Technological advances, improvements in management and efficient exploitation of economies of scale all influence the rate of growth in productivity. Productivity growth can be driven by producers generating the same amount of output with fewer inputs, increasing output with the same amount of inputs, or increasing output at a faster rate than inputs.

Participating in the GRDC farm business management pilot course are South Australian agricultural consultants Matt McCallum (left), of McAg Consulting, Laura; Alli James-Martin of Landmark, Naracoorte; and Sam Holmes, of Holmes Farm Consulting, Maitland. *Photo: GRDC*

The latest TFP results available from ABARE are for the period between 1977–78 and 2007–08, over which period productivity growth in the broadacre sector averaged 1.4 percent per year. Results to 2009–10 will become available in two years time.

TFP growth has not been constant over the past three decades. Between 1977–78 and 2000–01, broadacre productivity grew at 2 percent per year; since 2000–01, growth has fallen by an average of 1 percent per year. More detailed statistical analysis by ABARE as part of the GRDC–ABARE Harvesting Productivity initiative established in 2009–10 suggests that this slowdown in agricultural productivity growth began earlier than 2000–01 and has undoubtedly been exacerbated by the effect of drought conditions in recent years.

Despite the slowdown, comparing industry TFP growth across the broadacre sector shows that the cropping industry has achieved the highest long-term annual growth rate, at 1.9 percent, followed by beef, mixed crop–livestock and sheep, as Table 8 shows.

TABLE 8:
Average total factor productivity growth by broadacre industry, 1977–78 to 2007–08 (percent per year)

Industry	Input growth	Output growth	Total factor productivity growth
Total broadacre	–0.6	0.8	1.4
Cropping specialists	0.2	2.1	1.9
Mixed crop–livestock	–1.6	–0.1	1.4
Beef	0.2	1.6	1.5
Sheep	–1.7	–1.5	0.3

Source: ABARE 2010, Australian Farm Survey Results 2007–08 to 2009–10, April 2010.

Productivity growth in the grains industry is fairly similar between regions, but the factors driving it are different. Producers in the southern and western agroecological regions realised strong growth in farm outputs and some input growth. In the northern agroecological region, productivity growth was the result of more modest growth in output, accompanied by a reduction in overall input use, as Table 9 shows.

TABLE 9:
Average total factor productivity growth by GRDC production region, 1977–78 to 2007–08 (percent per year)

Region	Input growth	Output growth	Total factor productivity growth
Northern	–0.4	1.5	2.0
Southern	1.8	3.6	1.9
Western	2.1	4.4	2.2

Source: ABARE 2010, Australian grains: Financial performance of grains producing farms, 2007–08 to 2009–10, 10.1 Canberra.

Productivity

The GRDC–ABARE Harvesting Productivity initiative was established to significantly increase understanding of the drivers and constraints of productivity growth in the Australian grains industry and identify where GRDC investments should be targeted to improve industry productivity over the long term.

The key findings in the first year of the initiative were:

- Productivity growth in Australian broadacre agriculture has declined since the mid-1990s due to a combination of adverse climatic conditions and declining public investment in agricultural R&D.
- Poor seasonal conditions—particularly drought, with some parts of southern Australia experiencing eight consecutive years of below-average rainfall after 2000—contributed to reduced agricultural output and thus slower productivity growth in the past decade.
- The observed slowdown in productivity growth was not explained by adverse climatic conditions alone. Only when the combined effects of adverse climatic conditions and the decline in public investment in agricultural R&D are incorporated in the analysis can the turning point be accounted for.
- In addition to technological advancements through R&D, increased innovative capacity in the agricultural sector—through higher levels of skills and education, improvements to market access, and the removal of impediments to adjustment—is required. Continued efforts in all these areas are required for the agricultural sector to be well positioned to return to strong productivity growth under more favourable climatic conditions in the future.

The full report is available from ABARE's website, at www.abareconomics.com.

During 2010–11 the GRDC–ABARE Harvesting Productivity initiative will further investigate the role of R&D, including international spillovers, innovation adoption and resource allocation, in achieving sustained productivity growth.

Esperance growers discuss grazing crops with GRDC Board members during their recent trip to WA. *Photo: GRDC*

Each year the GRDC tailors its investment portfolio to best address the R&D priorities identified by its key customer groups: Australian grain growers and the Australian Government.

Australian grain grower priorities

Australian grain growers' R&D priorities were identified during the development of *Prosperity through Innovation*, through the GRDC's consultations with the Grains Council of Australia, local research advisory committees, grower groups and grower organisations and individual grain growers.

Key priorities identified were:

- farm management
  - integrated farming practices and technologies
  - integrated management of weeds, diseases and pests
  - herbicide resistance management
- variety development
  - biotechnology for improving genetic gain
  - superior new varieties
- environmental
  - responses to climate change
  - improved water use efficiency
  - sustainability and resource management
  - soil health and biology
- new and innovative product development
- capacity building
  - improving skills, training and education in agriculture
  - farm business management.

Table 10 shows how GRDC investments and activities in 2009–10 directly addressed these priorities.

TABLE 10:
Investments and activities to meet grain grower priorities in 2009–10

Priorities	Examples of relevant GRDC investments and activities
Environmental	
Responses to climate change *Improved water use efficiency*	The 'Climate change focus' section of this annual report outlines a range of GRDC investments to address climate change. The GRDC provided support for: • the Climate Change Research Strategy for Primary Industries • the nitrous oxide research component of the Department of Agriculture, Fisheries and Forestry Climate Change R&D Program • a project to develop and deliver salt tolerance and water use efficiency traits for durum wheat • a project to increase water use efficiency in mixed crop–livestock systems • a pre-breeding research project with CSIRO which has identified wheat germplasm that is more drought tolerant at the reproductive stage of plant growth.
Sustainability and resource management *Soil health and biology*	The GRDC provided support for: • the second phase of the Grain and Graze program, through the Caring for our Country initiative • an investigation of potential uses of biochar in cropping systems—to improve soil health, crop nutrition and carbon sequestration • the launch of JumpStart®, a growth-enhancing phosphorous-solubilising microbial product for cereals and canola • new projects within phase 2 of the Soil Biology Initiative, including development of improved microbial formulations and a screening program for novel isolates for the control of soil-borne disease • a multiparty agreement with CSIRO, Flinders University, Murdoch University and the South Australian Research and Development Institute, to deliver the new Beneficial Microbes Program.

TABLE 10:
Investments and activities to meet grain grower priorities in 2009–10 *(continued)*

Priorities	Examples of relevant GRDC investments and activities
Farm management	
Integrated farming practices and technologies *Integrated management of weeds, diseases and pests* *Herbicide resistance management*	The GRDC supported workshops and consultation between the National Integrated Weed Management Initiative, the National Invertebrate Pest Initiative and the Department of Agriculture, Fisheries and Forestry about the future of the Australian Weeds Research Centre, to identify gaps in RD&E, collaborate with other research partners where relevant and inform future investment plans. Projects supported by the GRDC led to: • implementation of forecasting systems for stripe rust and wheat streak mosaic virus in Western Australia and blackspot in field peas in Western Australia and South Australia, delivered via web-based mapping • agreement from an Australian Cereal Rust Control Program consultative committee, including breeders, to implement a national communications strategy to discourage production of wheat varieties susceptible to rust • preparation of information packages on disease resistance, ready for incorporation into integrated pest management of sclerotinia and white rust in canola • incorporation of validated field efficacy and performance data into a business plan for commercialisation of the Harrington Weed Seed Destructor. The GRDC also invested in work to deliver: • strategies for deployment of genetic resistance for Russian wheat aphid, barley stripe rust and stem rust (Ug99) • new approaches to weed seed bank management, including crop competition and competitive cultivars • research leading to herbicide label changes or acceptance of alternative modes of action.
Variety development	
Biotechnology for improving genetic gain	The GRDC supported work to evaluate the frost tolerance of pulse germplasm from the Australian Temperate Field Crops Collection and international sources, leading to the identification of tolerant and intolerant gene pools in field peas, lentils and chickpeas, and the incorporation of some field pea lines into the breeding program. A workshop was held to identify barriers to frost pre-breeding research progress, identify opportunities for future research and develop a national strategy for research coordination and collaboration. This initiative involved the development of an international collaboration with the International Center for Agricultural Research in the Dry Areas to access potential sources of frost-tolerant cereal and pulse germplasm.
Superior new varieties	National Variety Trials (NVT) results for varieties released in 2009–10 showed that: • the new wheat varieties yielded up to 12% more than current dominant varieties with comparable quality and disease resistance • the new barley varieties yielded up to 16% more than current dominant varieties • over 90% of the canola varieties that were targeted at blackleg-prone areas had a blackleg resistance rating of 7 (moderately resistant) or above. Trial results also showed that 90% of wheat second-year entries (retentions) in NVT trials met current regional minimum disease standards for rust resistance.

TABLE 10:
Investments and activities to meet grain grower priorities in 2009–10 *(continued)*

Priorities	Examples of relevant GRDC investments and activities
New and innovative product development	
	Through a GRDC joint venture, JumpStart®, a growth-enhancing phosphorous-solubilising microbial product for cereals and canola, was launched for the 2010 sowing season. The GRDC was involved in contracting new projects within phase 2 of the Soil Biology Initiative, including development of improved microbial formulations and the Beneficial Microbes Program, a screening program for novel isolates for the control of soil-borne disease. A multiparty agreement was reached with CSIRO, Flinders University, Murdoch University and the South Australian Research and Development Institute to deliver the Beneficial Microbes Program. The GRDC also contracted: • work by the Scottish Agricultural College to investigate the potential of biopolymers • a number of projects investigating the use of fungal and nematode isolates as biological control agents for target pests. Other achievements in new product development included: • identification of a range of potential partners, and commencement of negotiations, for the commercialisation of the grain fumigant GLO2 • identification of a potential water use efficiency project for investment in 2011–12, through the Cooperative Research Centre for Polymers • collaboration with the University of Melbourne and a commercial enzyme company to develop enzymes to increase sorghum digestibility.
Capacity building	
Improving skills, training and education in agriculture *Farm business management*	The GRDC's support for industry capacity building included: • commencing grain storage extension training • implementing precision agriculture training, attended by more than 200 growers • developing a training program for up-skilling extension providers • scoping a new two-day training workshop for grains advisers on cereal foliar disease management • engaging with national and regional agribusiness reference groups to prioritise extension activities.

Australian Government priorities

The relevant Australian Government R&D priorities are identified in:

- the National Research Priorities, as outlined by the Prime Minister in December 2002, and their associated priority goals
- the Rural R&D Priorities as announced to the RDCs by the Minister for Agriculture, Fisheries and Forestry in May 2007
- a letter written to the GRDC Chair by the Minister for Agriculture, Fisheries and Forestry in February 2010.

Table 11 shows the relationship between the government's research priorities and the associated goals, including the Minister's restated and new priorities.

Table 12 shows how GRDC investments and activities addressed the priorities in 2009–10. The total expenditure allocated to each of the Australian Government's priorities is shown in detail in Appendix A.

TABLE 11:
Australian Government research priorities and associated goals

National Research Priorities (NRP)			
An environmentally sustainable Australia	***Promoting and maintaining good health***	***Frontier technologies for building and transforming Australian Industries***	***Safeguarding Australia***
A1: Water—a critical resource A2: Transforming existing industries A3: Overcoming soil loss, salinity and acidity A4: Reducing and capturing emissions in transport and energy generation A5: Sustainable use of Australia's biodiversity A6: Developing deep earth resources A7: Responding to climate change and variability	B1: A healthy start to life B2: Ageing well, ageing productively B3: Preventive healthcare B4: Strengthening Australia's social and economic fabric	C1: Breakthrough science C2: Frontier technologies C3: Advanced materials C4: Smart information use C5: Promoting an innovation culture and economy	D1: Critical infrastructure D2: Understanding our region and the world D3: Protecting Australia from invasive diseases and pests D4: Protecting Australia from terrorism and crime D5: Transformational defence technologies

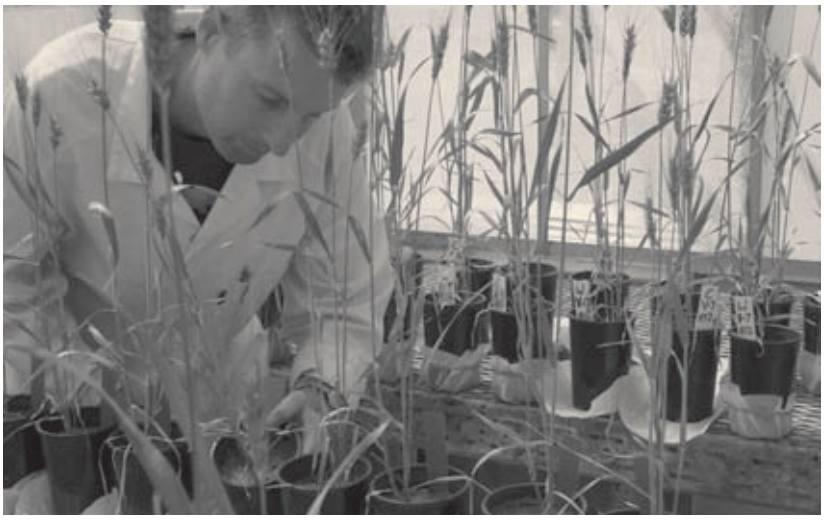
Rural R&D Priorities (RRDP)				
Productivity and Adding Value	***Supply Chain and Markets***	***Natural Resource Management***	***Climate Variability and Climate Change***	***Biosecurity***
Improve the productivity and profitability of existing industries and support the development of viable new industries	Better understand and respond to domestic and international market and consumer requirements and improve the flow of such information through the supply chain, including to consumers	Support effective management of Australia's natural resources to ensure primary industries are both economically and environmentally sustainable	Build resilience to climate variability and adapt to and mitigate the effects of climate change	Protect Australia's community, primary industries and environment from biosecurity threats

Supporting the Rural R&D Priorities	
Innovation Skills	***Technology***
Improve the skills to undertake research and apply its findings	Promote the development of new and existing technology

TABLE 11:
Australian Government research priorities and associated goals *(continued)*

Minister's R&D Priorities (MRDP)					
Productivity improvement	***Maintaining and improving international market access opportunities***	***Value chain effectiveness and efficiency***	***Sustainable environmental resource management***	***Climate change***	***Biosecurity***
To generate new knowledge, which will lead to improved technology that will be adopted by producers to increase productivity	To combat pests and diseases that can potentially be obstructive to trade and to guide production decisions in accordance with the requirements of consumers	Investment in research and development must extend beyond the farm gate to ensure the whole value chain is able to operate at optimum levels	To build and share our knowledge to ensure our soils, water and vegetation are managed properly and invasive pests are controlled	To reduce greenhouse gas emissions and improve soil management, and assist producers to adapt and change farming practices whilst boosting productivity	Maintain our research capability to prevent and deal with disease outbreaks, particularly as such biosecurity threats are expected to become more prevalent with climate change

Supporting the Minister's R&D Priorities			
Workforce, skills, education	***Diversity***	***Collaboration***	***Evaluation***
RDCs should be taking a stronger role in educating future scientists, improving the knowledge and skills of producers and encouraging people to work in the sector	RDCs should take a greater role in building strong leadership capacity in the sector and encourage a diversity of people in primary industries, including a greater role for Indigenous Australians, women and young people	The national Primary Industries Research, Development and Extension Framework has progressed well to date, but it is important to maintain the momentum in 2010, to finalise the sector plans, develop the cross-sectoral plans and work through implementation	RDCs should support the current joint RDC evaluation process, to demonstrate returns on investment and guide future investment decisions



Research officer Daniel Huberli inspecting the root lesion nematode trial. *Photo: Evan Collis*

TABLE 12:

Investments and activities to meet the Australian Government National Research Priorities, Rural R&D Priorities and Minister's R&D Priorities in 2009–10

Priorities	Examples of relevant GRDC investments and activities
RRDP: *Productivity and adding value* ***MRDP:*** *Productivity improvement*	Australian breeders released several new varieties with higher yields and other attributes to improve productivity. New varieties included: • four wheat varieties • three oat varieties • two desi chickpea varieties • two lentil varieties • one broad bean variety. National Variety Trials (NVT) results showed that: • the new wheat varieties yielded up to 12% more than current dominant varieties with comparable quality and disease resistance • the new barley varieties yielded up to 16% more than current dominant varieties. The National Durum Wheat Improvement Program identified advanced breeding lines with higher yield potential than existing varieties. The GRDC identified potential partners, through an expression of interest process, and commenced negotiations for licensing of the wheat yield gene.
NRP: *Promoting and maintaining good health* ***RRDP:*** *Supply chain and markets* ***MRDP:*** *Maintaining and improving international market access opportunities* *Value chain effectiveness and efficiency*	Among its activities to help expand international markets for Australian grains, the GRDC: • contracted a project to investigate how the inclusion of Australian wheat can improve the quality of Chinese noodles and steamed breads • engaged potential partners in North America for the commercialisation of high-amylose wheat, through the Arista Cereal Technologies Pty Ltd joint venture. The GRDC also supported work to: • evaluate ultra-low gluten barley malt in commercial-scale brewing facilities • understand consumer attitudes, perceptions and dietary practices in relation to cereals, wholegrain foods and other products that contain wheat • improve food quality and end-use market acceptance of Australian pulses.
NRP: *An environmentally sustainable Australia* ***RRDP:*** *Natural resource management* ***MRDP:*** *Sustainable environmental resource management*	The GRDC: • gained support for the second phase of the Grain and Graze program, from growers, agribusiness, researchers, natural resource management bodies and the Australian Government's Caring for our Country initiative • contracted new projects within phase 2 of the Soil Biology Initiative, including the development of improved microbial formulations and the Beneficial Microbes Program, a screening program for novel isolates for the control of soil-borne disease • secured a multiparty agreement with CSIRO, Flinders University, Murdoch University and the South Australian Research and Development Institute, to deliver the new Beneficial Microbes Program. Through a GRDC joint venture, JumpStart®, a growth-enhancing phosphorous-solubilising microbial product for cereals and canola, was launched for the 2010 sowing season. Other GRDC investments in sustainable natural resource management included projects to: • investigate potential uses of biochar in cropping systems—to improve soil health, crop nutrition and carbon sequestration • develop a template to facilitate the entry of soil test calibration data and associated metadata for single-year trials into a national database.

TABLE 12:
Investments and activities to meet the Australian Government National Research Priorities, Rural R&D Priorities and Minister's R&D Priorities in 2009–10 *(continued)*

Priorities	Examples of relevant GRDC investments and activities
NRP: *An environmentally sustainable Australia* ***RRDP:*** *Climate variability and climate change* ***MRDP:*** *Climate change*	The 'Climate change focus' section of this annual report outlines a range of GRDC investments to address climate change. Other relevant activities included membership of the Climate Change Research Strategy for Primary Industries (now hosted by the University of Melbourne) and ongoing support for the nitrous oxide research component of the Department of Agriculture, Fisheries and Forestry Climate Change R&D Program.
NRP: *Safeguarding Australia* ***RRDP:*** *Biosecurity* ***MRDP:*** *Biosecurity*	Plant Health Australia, through the GRDC-supported Cooperative Research Centre for National Plant Biosecurity, finalised new emergency plant pest contingency plans for possible incursions of: • the diseases leaf spot, leaf blight of wheat, leaf blotch of cereals, *Fusarium* wilt of chickpeas, lentils and lupins, and stem rust of wheat (Ug99) • the insect pests spotted stalk borer and corn earworm. Plant Health Australia also developed pest-specific surveillance plans for Russian wheat aphid, hessian fly and sunn pest. The GRDC invested in work to deliver strategies for the deployment of genetic resistance for Russian wheat aphid, barley stripe rust and stem rust (Ug99). Biosecurity information on high-priority pests was delivered to the grains industry through the Grains On-farm Biosecurity Program. GRDC-supported research led to the implementation of forecasting systems for stripe rust and wheat streak mosaic virus in Western Australia and blackspot in field peas in Western Australia and South Australia, delivered via web-based mapping.
NRP: *Frontier technologies for building and transforming Australian industries (includes the associated priority goal of 'Promoting an innovation culture and economy')* ***RRDP:*** *Innovation Skills* ***MRDP:*** *Workforce, skills, education; Diversity*	The GRDC supported: • 24 Travel Awards • 11 Industry Development Awards • 50 new training scholarships, including 18 Grains Industry Research Scholarships and 17 Grains Industry Undergraduate Honours Scholarships • 31 conferences • five Nuffield Australia Farming Scholarships • two Australian Rural Leadership Program participants. Six *Ground Cover* supplement titles were published, showcasing GRDC-supported research in: • water use efficiency • wheat breeding • pulse breeding • oilseed breeding • collaboration between rural R&D corporations • climate variability. The GRDC also published seven research reports, and: • commenced grain storage extension training • implemented precision agriculture training, attended by more than 200 growers • developed a training program for up-skilling extension providers • scoped a new two-day training workshop for grains advisers on cereal foliar disease management • engaged with national and regional agribusiness reference groups to prioritise extension activities.

TABLE 12:
Investments and activities to meet the Australian Government National Research Priorities, Rural R&D Priorities and Minister's R&D Priorities in 2009–10 *(continued)*

Priorities	Examples of relevant GRDC investments and activities
NRP: *Frontier technologies for building and transforming Australian Industries* ***RRDP:*** *Technology*	Researchers at the University of Adelaide developed methods to non-destructively quantify the effects of salinity on growth and senescence of lines of wheat, barley and *Triticum monococcum*. The methods are being used to develop high-throughput technologies to map for quantitative trait loci linked to three salinity tolerance mechanisms. The GRDC supported projects to develop molecular markers for use in breeding wheat, barley, canola and certain pulses (lentils, field peas, faba beans, chickpeas and lupins). Pre-breeding projects at the GRDC-supported Molecular Plant Breeding Cooperative Research Centre are mapping rust resistance genes in wheat and developing breeding tools that enable breeders to predict the effects of yield and quality gene combinations 'in-silico'. Among the project results in 2009–10: • New molecular markers were developed for major phenological adaptation genes in wheat and barley. • Progress was made on the fine mapping of the 2A rust resistance trait locus and yield, drought and salt tolerance quantitative trait loci in wheat, and on the development of closely linked markers. • The effects of different combinations of photoperiod, height and vernalisation genes on yield in wheat were estimated, and the results were communicated to breeders.
MRDP: *Collaboration*	The GRDC's collaborative projects with other rural R&D corporations (RDCs) are listed in detail in Appendix C. Some examples are: • the diamondback moth (*Plutella xylostella*) control and insecticide resistance management project • the Managing Climate Variability program • cross-RDC collaboration on measuring the impact of R&D • a project to improve the integration of legumes in grain and sugar • the National Program for Sustainable Irrigation • the development of the Primary Industries Ministerial Council's National Primary Industries RD&E Framework. International collaborations included: • pre-breeding projects based on germplasm from the International Maize and Wheat Improvement Center (CIMMYT) and the International Center for Agricultural Research in the Dry Areas (ICARDA) • research visits to key international markets, student exchanges and communication with the R&D communities to understand and respond to changing market requirements • Australian Centre for International Agricultural Research projects with the overall aim of using germplasm from China, India and Australia to enhance productivity of canola-quality *Brassica napus* and *B. juncea* in all three countries.

TABLE 12:
Investments and activities to meet the Australian Government National Research Priorities, Rural R&D Priorities and Minister's R&D Priorities in 2009–10 *(continued)*

Priorities	Examples of relevant GRDC investments and activities
MRDP: *Evaluation*	Evaluations of the longer term economic, social and environmental impacts of RD&E investments were undertaken as a joint process with the other RDCs. These included impact assessments on eight project clusters: • Australian winter cereals molecular markers • crop nutrition • grain storage • oilseed breeding • premium grains for livestock • soil biology • summer coarse grains breeding • weeds management. The GRDC sought a range of feedback on its performance, including through: • the 2010 GRDC Grower Survey • the Harvesting Productivity initiative, which was established with the Australian Bureau of Agricultural and Resource Economics to – significantly increase understanding of the drivers and constraints of productivity growth in the Australian grains industry – identify where GRDC investments should be targeted to improve industry productivity over the long term • the validation and integration baseline survey of farming management practices across agroecological zones, which concluded that – the rate of adoption of no-till is extremely high, at over 90 percent of cropped area in most zones – approximately 66 percent of grain farms are using soil tests, representing over 75 percent of the cropped area in most zones – over 90 percent of the stubble produced on the farms surveyed was either left intact (highest in north-west New South Wales) or left not standing (highest in Victoria's high-rainfall zone).

Notes: 'NRP' priorities are the Australian Government's four national research priorities.
'RRDP' priorities are the ministerial priorities for rural R&D corporations and companies.
'MRDP' priorities are the Minister's R&D priorities.

Photo: Arthur Mostead

Changes to Australia's climate are, and will continue to be, a threat to the Australian grains industry. The GRDC has a range of investments to provide grain growers with knowledge and technology to help them respond to the short-, medium- and long-term challenges that climate change presents.

Nitrous oxide emissions

Through the nitrous oxide program, the University of New England and Industry and Investment New South Wales are measuring nitrous oxide emissions from a canola crop and a chickpea crop on a dryland vertosol at Tamworth in north-west New South Wales.

In the 2009–10 experiments, the canola received a dressing of nitrogen as urea at sowing, and the chickpea was inoculated with effective nitrogen-fixing rhizobia. Emissions were measured seven times each day, using an automated system of chambers connected to a gas chromatograph.

Initial findings show that emissions are significantly lower for fixed nitrogen than for nitrogen applied as fertiliser (as illustrated in Figure 10). For example, during crop growth the fertilised canola plots emitted a total of 293 grams of nitrogen as nitrous oxide per hectare, equivalent to 0.37 percent of the nitrogen applied as urea, while the chickpea plots emitted 29 grams. Further work will establish whether this difference is consistent across years and management approaches.

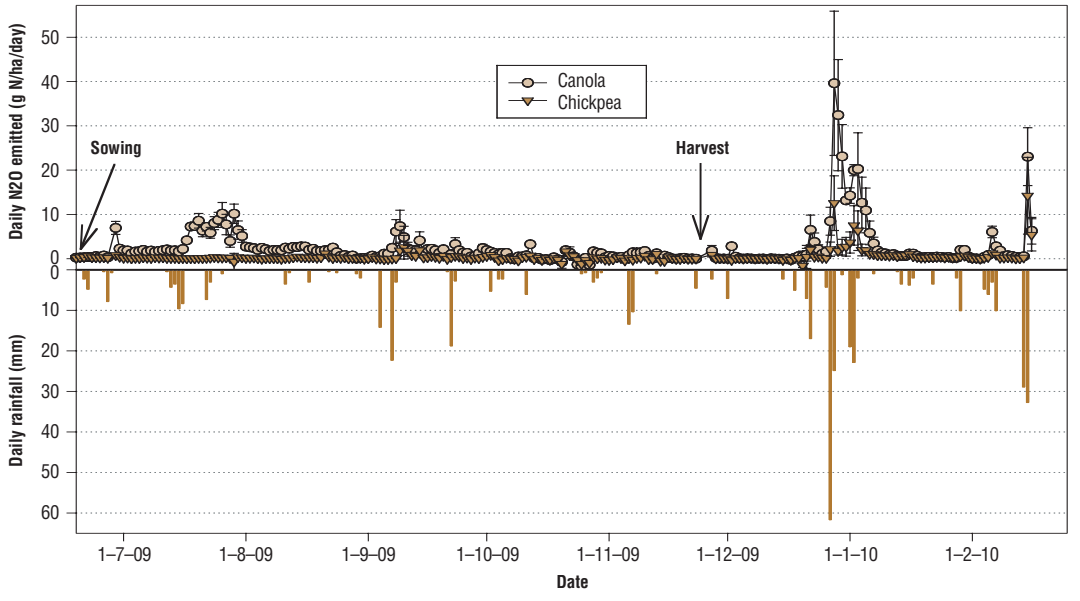
Soil carbon sequestration

Soil carbon sequestration has the potential to reduce Australian greenhouse gas emissions, and to provide an 'offset' for emissions from agriculture under an emissions trading scheme. Through its involvement in the Soil Carbon Research Program, led by CSIRO, the GRDC will keep grain growers informed about farming practices that will lead to long-term carbon storage while significantly increasing soil health, improving the productivity and sustainability of farming enterprises.

Adaptation and mitigation

GRDC-supported research is delivering data on the soil carbon potential of Australian soils and the impact of farm practices on nitrous oxide emissions, as well as continuously improving knowledge of crop performance under elevated levels of carbon dioxide in hotter, dryer climates. Combined, these outcomes give important insight into climate change impacts on the Australian grains industry, and means of adapting to and mitigating those impacts.

FIGURE 10:
Daily emissions of nitrous oxide from soil under canola and chickpeas as influenced by date since urea fertiliser application (canola only) and daily rainfall



Note: Data points are means of three replicates with standard errors of the means shown.

The GRDC is taking a lead role in a nationally coordinated program established to extend this knowledge through an initiative to demonstrate farming practices that may help growers respond to the impacts of climate change. The National Adaptation and Mitigation Initiative will develop a network of 25 demonstration sites across the north, west and south of Australia, incorporating data-intensive sites run by state agencies and farming practice sites run by grower groups. The initiative will also apply targeted communication strategies.

Climate Champions

Part of the GRDC's climate change communication strategy, the Climate Champions program has established a network of growers and agribusiness people to clearly and effectively communicate the findings of GRDC-supported climate change research. Through training and interaction with researchers and experts, the program members will be exposed to the most up-to-date information on climate change, so they can effectively convey information to growers, grower groups and other members of the broader community. In 2009–10 the participants were inducted and participated in communication training.

Managing Climate Variability

During 2009–10 the GRDC-supported Managing Climate Variability program continued to progress its research on:

- improved forecasting—investments are focused on improving Australia's dynamical model POAMA (Predictive Ocean Atmosphere Model for Australia)
- commodity preparedness for a more variable and changing climate—work is underway or completed for
  - Western Australian grains, with the application of dynamic forecasts to determine sowing times and fertiliser inputs
  - horticulture, with temperature thresholds established for a range of key crops and the imperatives for improved temperature forecasting well established
  - sugar cane, with productivity, profitability and water quality impacts analysed for three of the Intergovernmental Panel on Climate Change scenarios
- farmer-led innovation, with 45 leading farmers appointed as Climate Champions.

Underpinning the delivery of knowledge to meet farmers' needs, the Climate Kelpie website went live in 2009–10. The site provides instant access to both forecasts and climate adaptation decision support tools.

Manual and automated collection methods are being used to establish nitrous oxide emissions from different soils under different management practices, farming systems and climates. *Photo: Queensland University of Technology*

Collaboration

Collaboration is at the heart of the GRDC's approach to adding value to the Australian grains industry. The majority of the GRDC's investment in R&D is with partners that co-fund the work as well as conducting the activities. This includes partnerships to provide a path to market for the results of R&D projects. Collaborations are also formed between RDCs to deliver cross-sectoral benefits and to conduct evaluation.

Collaborative approach

In the GRDC's experience, successful collaboration is underpinned by:

- alignment of interests between the collaborating parties
- clear expectations about the purpose of the collaboration and the desired outputs
- proven track record in delivery
- high-quality science (aided by the collaborating parties having made significant contributions in the public domain)
- multi-level relationships between the collaborating organisations (relationships between those at the bench, management personnel and executive-level personnel).

The integral nature of collaboration to the GRDC's business is described below in the context of the GRDC's four corporate strategies.

Deliver against Australian Government priorities

The GRDC collaborates with a vast range of RD&E partners—including other RDCs; universities; CSIRO; agencies of state and territory governments and the Australian Government; growers; and all sectors of the Australian grains industry—to identify and respond to major rural issues.

Many of these issues, such as managing climate variability, are priorities for growers as well as for the Australian Government. Indeed it is difficult to draw the line between benefits on farm and benefits to the public: the relationships that the GRDC builds with growers, advisers and industry more broadly greatly assist with delivering environmental and social benefits.

On issues that span the Australian rural sector, such as climate change, fodder, feed grain and soil health, the GRDC is involved in a number of collaborations with other RDCs. In 2009–10, these included:

- the Draft Management Extension Strategy for the Northern Region—GRDC and Cotton Research and Development Corporation (CRDC)
- the Australian Feedgrain Partnership—GRDC, Australian Pork Limited (APL), Dairy Australia (DA), Pork Cooperative Research Centre Limited, Meat and Livestock Australia (MLA), and Australian Egg Corporation
- Pastures Australia—GRDC, Australian Wool Innovation (AWI), MLA, DA and Rural Industries Research and Development Corporation (RIRDC)
- cross-RDC collaboration on measuring the impact of R&D
- the Collaborative Partnership for Farming and Fishing Health and Safety—GRDC and RIRDC
- work to
  - improve the utilisation of red wheat by lactating dairy cows—GRDC and DA
  - improve the integration of legumes in grain and sugarcane farming systems in southern Queensland—GRDC and Sugar Research and Development Corporation (SRDC)
  - define critical soil nutrient concentrations in soils supporting grains and cotton—GRDC, CRDC and Department of Employment, Economic Development and Innovation, Queensland
  - reduce nitrous oxide emissions from sugarcane lands—GRDC and SRDC
  - understand helicoverpa insecticide resistance, including monitoring, mechanisms and management—GRDC, CRDC and Industry and Investment New South Wales.

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

The RDCs also worked together or shared information on a range of common issues including project management, legal agreements, records management, archiving and intellectual property management.

Coordinate a national grains R&D agenda and portfolio

The GRDC's ongoing coordination of a national grains R&D portfolio involves collaboration both within the grains industry and across the rural sector.

In November 2008, the Primary Industries Ministerial Council endorsed the National Primary Industries RD&E Framework, to facilitate a more coordinated and collaborative approach to rural RD&E. Under the framework, separate RD&E strategies were developed for 14 primary industries and seven cross-industry sectors. The Department of Agriculture and Food, Western Australia, and the GRDC were the lead agencies coordinating the development of a national RD&E strategy for the grains industry.

The GRDC and its research partners are involved in a number of nationally coordinated R&D programs that tackle key grains industry issues, including:

- plant genetic resources and pre-breeding, such as strategic alliances within breeding programs, including for pre-emptive breeding and virus screening
- crop breeding and variety trials
- farming practices, such as conservation farming and precision agriculture
- integrated weed management, disease management and pest management
- environmental issues, such as climate change, salinity and water use efficiency
- cooperation throughout the grains value chain on issues such as efficiency in end point royalty collection
- extension of R&D outcomes
- capacity building.

Ensure R&D is market-driven

The GRDC's role is to deliver benefits to the Australian Government and Australian grain growers. Benefits can only be realised where there is a path to market for new technology and an extension pathway for new knowledge, leading to practice change. Examples of GRDC-supported activities where all three components exist are the accreditation of new barley varieties for malting, and wheat variety classification.

The GRDC's processes for allocating resources to invest in RD&E integrate the views of grain growers, who will be the ones incorporating innovations into their farming operations. This occurs primarily through the three regional panels.

The GRDC investment processes also create opportunities for groups to feed in their priorities for RD&E. For example, the National Agribusiness Reference Group discusses RD&E needs from the point of view of agribusiness and provides its conclusions to the GRDC for consideration.

Further, there are specific projects where the GRDC invests in a technology that would not become available to Australian growers without a partnership approach. Examples include collaboration with Novozymes Biologicals Australia Pty Ltd to bring two growth-enhancing phosphorous solubilisation products to Australia. JumpStart® was launched in 2010 for use on cereals and canola, while TagTeam® was released in 2009 for use on pulses.

The GRDC has actively worked over the past years to create more commercial drivers in breeding programs. Inherent in this strategy is the requirement that new varieties must generate value for growers. In turn, investment in pre-breeding must generate the technology (genetics) and knowledge that breeding programs require. To achieve this, the GRDC works to ensure that regular communication between breeders and pre-breeders occurs, and measures the nature and frequency of pre-breeding outputs that are taken up by breeders.

Grow and leverage total grains R&D investment

On a global scale, Australia is a small investor in agricultural R&D. Growing and leveraging the total investment in grains R&D is therefore important.

Collaboration is the key to leveraging investment in grains R&D. Many different aspects of the innovation system assist the GRDC to find and engage meaningfully with potential collaborators, including:

- Australia's reputation and track record in R&D, largely built through public funding of research
- the GRDC's ability to support scientific exchanges (such as conferences, travel awards and PhD scholarships) so that personal relationships are developed between researchers in different countries
- the GRDC's ability to invest cash into R&D projects
- the GRDC's ability to invest to ensure technology is made available to Australian growers even if the Australian market is not particularly attractive to the technology owners/developers
- intellectual property protections, particularly plant breeder's rights and the value capture system that they have created
- the resilience and creativity of the Australian grains industry in fighting to remain competitive.

Table 4 provides examples of projects which achieved significant leverage, including dollar ratios.

The GRDC continues to expand its strong and productive relationships with international R&D providers. For example, in order for Australian grain growers to have access to superior varieties and compete in global markets, Australian plant breeders and researchers need access to both international germplasm and knowledge from overseas. The GRDC plays an important role in forging long-term strategic collaborations with key international research partners such as the International Maize and Wheat Improvement Center (CIMMYT), the International Center for Agricultural Research in the Dry Areas (ICARDA), the Australian Centre for International Agricultural Research (ACIAR) and the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT).

CASE STUDY

Benefits flow from irrigation research

Irrigators continue to improve their water efficiency and productivity. Through collaborative investments in irrigation research, the National Program for Sustainable Irrigation (NPSI) is helping Australia to find ways to both save water and use the limited resource in a sustainable and productive manner.

This collaboration of 13 government, irrigation authority and primary producer bodies has been responsible for improved irrigation scheduling and application techniques, as well as other measures, which have resulted in significant water savings while improving productivity. The partners share many common research interests, including investigations of soil factors, water scarcity, irrigation system modernisation, biosecurity in irrigated landscapes, economics and practical tools that are applicable to all irrigators.

Working together creates certain efficiencies and synergies which help to optimise returns from R&D investments. Grain growers using irrigation can learn from growers of more intensively irrigated cotton and horticulture crops. At the same time, growers in those industries can learn from the grains industry's experience of issues such as managing limited water.

The Water Smart Cotton and Grains project is an example of this two-way flow of information. This project is measuring and benchmarking cotton and grain crop water use on farms. Irrigators can use this information to improve the efficiency of their systems. There has been a strong component of training and farm field demonstrations to assist those who are changing practices.

The GRDC aims to provide growers with best-practice guidance on how to integrate traditional irrigated rice and cotton production with irrigated and rain-fed grain crops. The NPSI publication *Irrigation Essentials*—which can be downloaded from the NPSI website, npsi.gov.au— includes information on irrigation enterprise establishment and management, irrigation methods, business management, creating a water budget, scheduling and monitoring, and agronomy and soil considerations.

The document is a useful reference for irrigators and those involved in policy making, agribusiness and research. It is a snapshot of some of the latest R&D that is leading to improved technology, and enables the sharing of knowledge and practice change across all agricultural commodities and horticultural industries.

The program is currently leading the development of a new vision for irrigated agriculture in Australia, and its research, development and extension, to further improve collaboration in the sector.

Pictured at the launch of the publication* Irrigation Essentials *are (from left) Bruce Finney (executive director of the Cotton RDC), Minister for Agriculture, Fisheries and Forestry Tony Burke, Guy Roth (NPSI program manager) and Andrew Parkes (Keytah farm manager and NPSI management committee member). *Photo: National Program for Sustainable Irrigation (NPSI)*

International collaboration

Australia is a net importer of the germplasm that underpins development of improved varieties of grain crops, since there are very few indigenous plant species related to Australia's primary grain crops. Consequently, maintaining links with key international research centres is essential to ensuring that Australian plant breeders are able to obtain the genetic material necessary to produce superior varieties.

The GRDC has established research alliances with CIMMYT and ICARDA and is pursuing similar partnerships with ICRISAT and international biotechnology companies. These partnerships ensure the long-term productivity and sustainability of the Australian grains industry through access to traits, intellectual property and germplasm held by international organisations.

In addition, alliance agreements provide a framework for information sharing in accordance with Australia's obligations as a signatory to the International Treaty on Plant Genetic Resources for Food and Agriculture.

During 2009–10 the GRDC continued collaborative research programs with CIMMYT and ICARDA in the areas of:

- development of wheat, barley and pulse germplasm with improved yield stability under drought and temperature extremes
- identification of wheat germplasm with enhanced resistance to the soil-borne pathogens crown rot, root lesion nematode and cereal cyst nematode, and to leaf, stem and stripe rust diseases
- identification of wheat and pulse germplasm resistant to a range of insect pests that pose potential biosecurity threats to the Australian grains industry, including Russian wheat aphid, hessian fly and sunn pest.

In addition, the GRDC hosted the 2010 CIMMYT board of trustees meeting in Canberra. Following the board of trustees meeting, GRDC and CIMMYT management held a meeting to discuss the direction of future collaboration activities under the GRDC–CIMMYT alliance.

The GRDC also met with the Director-General and Deputy Director-General Research of ICRISAT to discuss the establishment of a formal alliance agreement similar to the GRDC's existing research alliances with CIMMYT and ICARDA. Common research areas are currently being identified with a view to contracting projects in the coming year.

Signalling the importance to CIMMYT of its partnership with Australia, the CIMMYT Board of Trustees, chaired by its President Julio Antonio Berdegue, held their annual meeting at the GRDC office in April 2010. (From left) the GRDC Managing Director Peter Reading, CIMMYT's Board President Julio Antonio Berdegue, CIMMYT's Director-General Thomas A. Lumpkin, the GRDC chairman Keith Perrett. *Photo: Geoff Comfort*

The GRDC has held discussions with a number of international bioscience companies to discuss potential future collaborative projects in order to ensure that Australian grain growers have access to traits of interest held by these companies.

In 2010, the GRDC continued to support a collaborative project between the Department of Agriculture and Food, Western Australia, the Tasmanian Institute of Agricultural Research and Chinese scientists, focusing on improving the tolerance of Australian malting barley to waterlogging, acid soil, drought, frost and salinity. Australian barley varieties frequently lack appropriate genetic variation for abiotic stress tolerances. Chinese barley, on the other hand, has been cultivated for many thousands of years and therefore has been pragmatically selected for a range of abiotic stress tolerances. This project ensures Australian access to China's extensive and diverse barley germplasm collection.

International visitors

In 2009–10, the GRDC hosted a number of international visitors, 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.

High-level visits of particular note included those of:

- a three-person delegation from CHS Inc., in August 2009
- a nine-person delegation from the ACIAR Policy Advisory Council, in November 2009
- a 12-person delegation from CIMMYT, in April 2010.

Output Group 1—Practices

The Practices output group develops and promotes innovative and integrated practices and technologies to increase the grains industry's capacity for on-farm change, particularly in the areas of soil constraints, water and nutrient use, crop threats, environmental variability, agronomic improvements and biosecurity. Through the Practices output group, the GRDC aligns sustainable production systems research at a farm level with broader, community-based land use initiatives.

The Extension and Grower Programs area is focused on improving the timeliness, relevance and quality of information packages on offer to customers. Alliances between growers and advisers are becoming increasingly important in ensuring that new and improved varieties, practices and technologies are integrated into farming systems. Recognising that information needs and preferred delivery mechanisms differ according to production region, enterprise mix and individual circumstances, the Practices output group packages and tailors information that is regionally specific, and delivers it to growers and advisers through appropriate networks.

The integration of natural resource management practices into cropping systems is essential for the long-term viability of the grains industry. The GRDC has significant partnerships with a range of bodies established by the Australian Government and state governments to deal with environmental issues.

The further development of research and delivery platforms and relationships with extension networks will continue to accelerate RD&E outcomes.

Table 14 summarises the achievements of the Practices output group against its performance measures for 2009–10 and its objectives and strategies for 2007–12. The following sections describe some of the results of the output group's investments during the year.

CONTENTS

Nutrient management

Grain growers' decisions about fertiliser application are based on the factors of nutrient use efficiency: the nutrient requirements of plants, nutrient availability in soils, and nutrient losses that can occur during crop growth (for example, through denitrification or erosion). Given that fertiliser inputs comprise about 30 percent of the total variable costs of crop production, improved nutrient use efficiency may significantly increase profitability.

Decision-making tools

The GRDC has invested in Making Better Fertiliser Decisions for Cropping, a national project that seeks to reassess criteria for testing soil nutrients for cereal, pulse and oilseed crops, using historical crop nutrient–soil test response calibration trials conducted in Australian grain-growing regions. The project is led by Industry and Investment New South Wales, and involves substantial collaboration between the grains industry, the fertiliser industry, agronomic consultants, state and federal agencies, agribusinesses and universities. In 2009–10 the database was established.

Biochar

Biochar is a deliberately stabilised form of carbon made by the pyrolysis (slow, low-oxygen burning) of biomass, such as manure, wood or straw.

Through a national investment with CSIRO and the University of Western Australia, the GRDC is investigating the ability of biochar to improve crop nutrition, and ways of reducing production costs to make biochar affordable for use in agriculture. An associated project, funded through the Department of Agriculture, Fisheries and Forestry, is investigating the potential of biochar as a means of sequestering carbon.

More than 70 types of biochar are being evaluated for their impact on soil parameters such as carbon levels, pH, electrical conductivity, cation exchange capacity, adsorption and water-holding capacity. Initial findings show that the source of the biochar has the greatest impact on its water-holding capacity, while the pH is affected most by the temperature at which the biochar is produced.

Weed management

With support from the GRDC, the National Integrated Weed Management Initiative has helped to coordinate strategic investment in projects on surveillance, cultural and genetic approaches to weed management in the grains industry. Key projects from the initiative include:

- support for the Australian Glyphosate Sustainability Working Group
- delivery of training in integrated weed management to growers and advisors around Australia
- field evaluation of non-chemical approaches, including the use of the Harrington Weed Seed Destructor, in integrated weed management systems.

GRDC-supported work to address the increasing incidence of glyphosate resistance produced useful tools and management strategies for use by growers in 2009–10. For example:

- The Western Australian Herbicide Resistance Initiative conducted research highlighting the potential risk of low glyphosate rates on herbicide resistance development in cross-pollinated ryegrass compared to the low-risk resistance development in self-pollinated wild oat populations. The initiative also conducted research to identify the potential risks arising from low application rates for new pre-emergent herbicides.
- Research conducted by the University of Adelaide indicates that there are herbicide solutions available for controlling glyphosate-resistant annual ryegrass on fence lines.
- A glyphosate risk assessment tool was developed by the Department of Employment, Economic Development and Innovation, Queensland, and Industry and Investment New South Wales, in collaboration with the Cooperative Research Centre for Cotton Catchment Communities. The tool provides modelling and management tactics for the control of glyphosate-resistant barnyard grass and liverseed grass.

Disease management

The GRDC supports ongoing projects by state government pathology services investigating integrated disease management. In 2009–10, this included research by the Western Australian Department of Agriculture and Food on:

- the epidemiology and modelling for the forecasting of stripe rust and wheat streak mosaic virus epidemics in wheat in Western Australia
- forecasting for blackspot in field peas in Western Australia and South Australia, delivered through web-based mapping (in collaboration with the South Australian Research and Development Institute).

The Australian Cereal Rust Control program conducts pathogenicity surveys and cereal rust pathogen studies for the Australian grains industry. In 2009–10, this included studies of pathogen variability and pathotyping support for 754 rust samples received from growers, advisors and pathologists. The program also screened germplasm and worked on the development of new rust-resistance gene donors.

University of Melbourne researchers have developed molecular markers from the blackleg genome sequence and are using them to develop a rapid molecular test to monitor the virulence of the blackleg fungal population in blackleg-infested canola stubble from across Australia. This research has also made significant progress in mapping and characterising the genes involved in plant infection.

Pest management

GRDC-supported research delivered important outcomes in pest management in 2009–10.

The University of Melbourne, in collaboration with the Western Australian Department of Agriculture and Food, developed a molecular assay for detecting wheat streak mosaic virus (WSMV) in individual wheat curl mites (the vector of transmission for the disease). The assay can be used in combination with mite-intensity analysis to assess risks of WSMV infection throughout the growing season, and has been used to address questions on various wheat curl mite biotypes, some of which do not appear to transmit the disease.

Through the National Invertebrate Pest Initiative, managed by CSIRO:

- training workshops in invertebrate pest identification and integrated pest management (IPM), designed to reduce costs and enhance sustainability for farmers, were delivered to more than 400 grain growers and advisors across Australia

- an invertebrate pest identification and IPM training manual, titled *I SPY: Insects of Broad-acre Farming Systems, Identification Manual and Training Resource*, was produced—the manual will be released early in the 2010 cropping season and used as the basis for all grains-related IPM training activities
- a responsive information service was delivered through online sources in each grain-growing region, including PestFAX, PestFACTS and BeatSheet Blog.

Research conducted by the Queensland Department of Employment, Economic Development and Innovation has supported the registration and use of biological and IPM-friendly selective chemical insecticides for helicoverpa and other caterpillars in grain crops. The revision of thresholds for helicoverpa in chickpeas and mung beans, and the development of new pesticide intervention thresholds for mirids and pod-sucking bugs in mung beans, have reduced reliance on broad-spectrum insecticides, with flow-on economic, environmental and social benefits.

Crop sequences

Dual-purpose canola

The GRDC has partnered with CSIRO to evaluate the potential for the use of canola (*Brassica napus*) as a dual-purpose crop—grazed in mid-winter and regrown to produce grain—in the mixed farming systems of southern Australia.

Field experiments were conducted across south-eastern Australia to select canola varieties that produced good biomass and had good disease resistance. Grazing experiments investigated animal health issues, stock growth and the impacts of grazing on crop growth and yield. The work showed that canola can produce a significant amount of high-quality forage and can regrow after grazing to yield as much grain as traditional, ungrazed canola crops.

Varieties of canola suitable for grazing were identified for particular regions, and a management guide was compiled and distributed widely to growers. Adoption has been rapid in some areas: at the autumn 2010 GRDC Crop Updates, 75 percent of growers either reported that they had grown dual-purpose canola or expressed interest in doing so.

Both experimental work and commercial experience indicate that dual-purpose canola can be highly profitable and provide growers with system flexibility in addition to the benefits of a break crop. Work will continue to further refine and adapt varieties to increase adoption of dual-purpose canola in other areas.

Wheat-on-wheat rotations

Increasingly, modern conservation cropping systems involve successive no-till crops of wheat, which can suffer yield penalties because of unidentified biological constraints in the rhizosphere.

The GRDC has partnered with CSIRO to improve understanding of the biological basis for the better performance of specific wheat varieties in intensive, no-till wheat-on-wheat rotations. The project aims to provide better breeding and management solutions to halt the 5–15 percent loss of yield that affects around half of the wheat-on-wheat crops grown in the Southern and Western regions. Field and glasshouse experiments have been undertaken that confirm varietal differences in performance in wheat-on-wheat rotations.

Biosecurity

In 2009–10, Plant Health Australia, through the GRDC-supported Cooperative Research Centre for National Plant Biosecurity (CRC NPB), finalised new emergency plant pest contingency plans for possible incursions of:

- the diseases leaf spot (*Alternaria humicola*), leaf blight of wheat (*Alternaria triticina*), leaf blotch of cereals (*Drechslera tetramera*), *Fusarium* wilt of chickpeas, lentils and lupins (*Fusarium oxysporum* f.sp. *ciceris*, *lentis* and *lupini*), and stem rust of wheat (*Puccinia graminis* f.sp. *tritici* pathotype Ug99)
- the insect pests spotted stalk borer (*Chilo partellus*) and corn earworm (*Helicoverpa zea*).

***Grain borer*—Rhyzopertha dominica.** *Photo: Rebecca Thyer*

Plant Health Australia has also developed pest-specific surveillance plans for Russian wheat aphid, hessian fly and sunn pest. Biosecurity information, including information on high-priority pests, has been delivered to the grains industry through the Grains On-farm Biosecurity Program.

CRC NPB researchers have studied highly damaging strains of Russian wheat aphid to determine the frequency and distribution of the biotypes and the molecular basis for the breakdown of plant resistance to them. This work has delivered resistance gene deployment strategies to help Australian cereal breeders to achieve sustainable and stable resistance.

The genus *Trogoderma* contains some of the world's most serious economic pests of wheat and other stored grain products. Currently, Australia harbours the warehouse beetle (*Trogoderma variabile*), which is morphologically similar to the more serious Khapra beetle (*Trogoderma granarium*), a subject of strict quarantine measures in many countries. CRC NPB research has significantly progressed real-time molecular detection methods to accurately discriminate the warehouse and Khapra beetles from several Australian native *Trogoderma* samples.

Tilletia indica, the cause of Karnal bunt in wheat, is the target of strict quarantine regulations in Australia. A molecular assay has been developed by the CRC NPB to simultaneously detect and identify Karnal bunt and other, related grass bunts found in wheat grains. The molecular assay will be a valuable surveillance tool to help ensure that Australia remains free of the disease.

Extension

The Extension and Grower Programs area is focused on improving the timeliness, relevance and quality of information packages on offer to customers. In 2009–10 the GRDC:

- integrated new demographic and extension provider datasets in the GRDC customer relationship management (CRM) system
- briefed RDCs and other organisations on features and benefits of the CRM system
- integrated data tables from the 2010 grower survey into the GRDC database
- provided presentations on the latest research to agribusiness consultants
- managed Land and Water Australia websites
- delivered new editions of Driving Agronomy
- published final project reports on the GRDC website
- integrated information on climate, soil and production research
- implemented the GRDC Extension Strategy and Implementation Plan.

Grain Orana Alliance

A GRDC-supported project with the Grain Orana Alliance Incorporated (GOA) was launched in 2009–10, bringing together researchers, advisors, growers and agribusinesses from the central-west region of New South Wales to develop solutions to local grain-growing issues and get them on farm as quickly as possible.

GOA's focus area covers 25 percent of the wheat area and 57 percent of the canola area in the Northern Region, and encompasses a range of soil types and production systems. GOA operates with a seven-person board, including a minimum of two growers, designed to ensure that the various research needs from across the area are represented.

After identifying research priorities through grower focus groups, GOA commenced GRDC-funded work in areas such as:

- investigating trace element nutrition in wheat
- increasing the reliability of canola in rotations by optimising row spacing and improving aphid control
- evaluating in-furrow treatments for stripe rust control in wheat, and seed treatments for insect control
- assisting the New South Wales Department of Primary Industry & Investment to validate potential options for crown rot control.

GOA is loosely based on the Northern Grower Alliance that operates successfully on a number of GRDC-funded projects in northern New South Wales and southern Queensland.

Tasmanian Research Advisory Committee

In 2009–10, the GRDC negotiated the formation of a research advisory committee with Tasmania's peak agricultural body, the Tasmanian Farmers and Graziers Association.

The inaugural meeting of the Tasmanian Research Advisory Committee was held in conjunction with the combined GRDC – Dairy Australia research update that was held in Launceston in July 2009.

The Tasmanian committee joins the existing network of research advisory committees across the eastern states, and ensures that the GRDC has balanced information on R&D priorities, and mechanisms for exchanging feedback, from all states in the Southern Region.

Involved in the GRDC farm business management pilot course are (from left) GRDC southern panel member Allan Mayfield, workshop presenter–author Bill Malcolm, and Applied Economic Solutions principal Mike Krause. *Photo: GRDC*

Grain Storage Extension Project

Just as they require reliable agronomic information to give their crops the potential to produce a good yield, growers need access to sound information about on-farm grain storage to produce reliable results and returns. Well-informed on-farm decisions in areas such as early harvest, selection of storage type, insect pest control, hygiene, grain moisture management, cooling, aeration and fumigation practices can have a significant impact on the market value of a parcel of grain.

In 2009–10, the GRDC initiated a project to provide up-to-date technical, scientific, biosecurity and economic information to assist producers with their decisions concerning grain storage. The project emphasises two-way information exchange, through face-to-face delivery and interaction at grower field days, on-farm demonstrations, the GRDC Research Updates and industry workshops.

Demand for workshops and information on grain storage and pest control was strong during the year. The project team delivered a total of 65 workshops, across Australia; released a fact sheet and other publications; and commenced developing a website.

Customer relationship management

In 2009–10, GRDC representatives held individual meetings with representatives from Meat and Livestock Australia, the Cotton Research and Development Corporation and the Fisheries Research and Development Corporation to discuss the GRDC's CRM system. These organisations are either planning or developing CRM systems, and consulted the GRDC to scope potential uses for customer engagement.

Websites

In response to feedback from both external and internal GRDC stakeholders, the search function on the GRDC website (grdc.com.au) was upgraded. The upgrade processes included:

- cleaning up the look and feel of the search engine and results
- improving the accuracy of information produced by search queries
- enhancing options available in advanced search queries
- removing redundant data page searches
- adding functionality to the search results.

A new form-based diary dates system was introduced to the GRDC website in July 2009. This system allows external parties to submit notices of events to the GRDC for approval and posting on the website. Benefits of the new system include:

- faster turnaround in approval times
- greater accuracy of information provided
- ability of a wider audience to submit notices.

A wide range of industry participants used the system during 2009–10.

When the Australian Government announced its intention to wind up Land and Water Australia (LWA) during 2009–10, the GRDC agreed to take over the websites managed by LWA. Under this arrangement, the following websites were successfully transferred to the GRDC during the year:

- Grain and Graze—www.grainandgraze.com.au
- Healthy Soils for Sustainable Farms (now Soil Health Knowledge Bank)—www.soilhealthknowledge.com.au
- Managing Climate Variability—www.managingclimate.gov.au.

Driving Agronomy

The GRDC's Driving Agronomy is an audio-based format to enable grains industry customers to hear the latest RD&E outcomes. Several new editions were produced by the GRDC in 2009–10, on topics including:

- precision agriculture workshops and technologies
- ways of understanding the farming business
- the ability of soil microbes to suppress disease
- IPM demonstrations
- quality assessment tools for pulses
- disease management in crop canopies.

CASE STUDY

Genetic keys unlock canola blackleg disease

The fungal diseases blackleg and stem rot are the major disease constraints to the production of canola (both *Brassica napus* and canola-quality *B. juncea*) in Australia.

Research at the University of Melbourne is helping the oilseeds industry to understand the processes of these diseases, through exploitation of the genome sequences of the fungi. The research aims to identify targets for disease control by novel fungicides and fungal genes that can protect against disease, and to transfer desirable genes into canola for improved disease resistance.

The blackleg fungus produces large numbers of wind-borne spores, which enables virulent isolates to rapidly increase in frequency under selection pressure from crops with major gene resistance. This leads to resistance breakdown, as occurred in canola crops on South Australia's Eyre Peninsula in 2003. It is important that new resistance sources are as durable as possible.

Angela Van De Wouw looking at blackleg isolates.
Photo: Angela Van De Wouw

The University of Melbourne's research is focused on two species of the blackleg fungus, *Leptosphaeria*: *L. maculans* and *L. biglobosa 'canadensis'*.

The *L. maculans* genome has been mined bioinformatically. With collaborators in France, the University of Melbourne researchers have identified 224 effector genes with roles in the development of blackleg disease.

This information has been used to develop molecular markers from the *L. maculans* genome sequence. The University of Melbourne team is using the markers to monitor blackleg fungal populations for virulence, develop a rapid assay to score alleles of avirulence genes, and map and characterise the genes involved in virulence.

In 2008, the team was the first to publish the identification of *L. biglobosa 'canadensis'* in Australia. The species was found in stubble of canola-quality *B. juncea* from New South Wales. The team is continuing work to survey Australian *B. napus* and *B. juncea* crops to identify incidence of and damage from *L. biglobosa 'canadensis'*; to acquire the genome sequence of the species; and to identify the genes involved in the disease.

CASE STUDY

Grower groups see the value of variable rate technology

Precision agriculture, through variable rate technology, has clearly demonstrated potential to reduce costs and raise productivity, by:

- making more efficient use of increasingly expensive inputs, such as fertiliser, fuel and herbicides
- targeting inputs to areas of greatest need
- strategically ameliorating soil constraints.

To improve the uptake of the technology, farm advisers and agronomists must understand its benefits, and provide advice about how data can be used to make better agronomic decisions, sustainably improve crop yields and increase profitability. Yet the Southern Precision Agriculture Association (SPAA) estimates, based on a member survey, that only 10 percent of advisers and agronomists in Australia have sufficient knowledge of precision agriculture to provide effective advice to growers.

On-farm demonstrations, organised through grower groups, have been successful in educating growers about the processes and potential gains of variable rate technologies under local conditions. Building on this model, in 2009–10 the GRDC and the SPAA, with support from agribusiness, worked together to organise relevant and effective workshops and on-farm demonstrations for growers and advisors in the Southern Region.

More than 200 people participated in a first round of workshops held across the region. A CD of training modules on setting up yield monitors for various header types was produced and distributed to participants.

All 12 farming systems groups from across the Southern Region took part in a second round of workshops, accompanied by on-farm trials and skills and knowledge surveys. The workshops covered variable rate setup, fertiliser replacement theory and the importance of variable rate management (or zonal management). A second CD was produced for participating landholders.

The favourable results of the workshop surveys will be used to draft a facilitator training program to ensure that trainers can be developed across the Southern Region. The project provides advanced training in precision agriculture to group facilitators.

The GRDC is supporting small hands-on precision agriculture (PA) training activities and on-farm PA trials to help in the wider use of PA in production management. *Photo: Emma Leonard*

CASE STUDY

Grower alliance knows how to ask the right questions

The Northern Grower Alliance (NGA) was established in 2006 as an incorporated variation of the many farming systems projects supported by the GRDC in the north. It is a group of around 70 skilled farming systems consultants who collectively represent a very large client base of growers in the cropping zone of northern New South Wales and southern Queensland.

The NGA model focuses on research driven by industry needs. In a region with relatively few grower groups and state-based agencies working on grains research, development and extension (RD&E), the NGA has created:

- additional capacity for on-farm research to validate both commercial and scientific objectives
- a broad network of growers and advisers to provide a pathway for the communication and extension of project outputs.

The geographic reach of the NGA is large, and covers areas of different soil and climatic types. To ensure that it maintains local relevance to both its consultant members and their grower clientele, the NGA operates though five nodes, representing Goondiwindi, Moree/Narrabri, Walgett, Liverpool Plains and the Gulargambone Rural Advisory Service.

Each node has a grower-based local consultative committee that meets twice a year, roughly following the winter and summer crop harvests. At these meetings, growers can:

- hear about the results of trials run by the NGA, and discuss their implications for adoption and for future RD&E priorities
- identify their own issues within a facilitated environment that helps to turn an issue into 'the right question'.

Issues and questions from each node are taken to a collective node management committee meeting around December each year. With input from a range of experts, including researchers, the issues are prioritised and translated into well-formed projects, including short-term trials, for funding support.

The NGA supports around 80 agronomic trials each year, complemented by in-project and post-project extension, communication and evaluation activities that feed back into ongoing and future activities. This process, with its emphasis on short-term trials held on farmers' properties, deep analysis of issues and results, and continuous grower participation, clearly embodies the principles of true farming systems RD&E.

Piotr Trebicki, senior entomologist at the Victorian Department of Primary Industries in Horsham, looks over trial plants being subjected to high levels of carbon dioxide. *Photo: Paul Jones*

GROWER SURVEY Snapshot

Trends in the adoption levels of specific farm practices are shown in Table 13. Of the 1,201 growers surveyed in 2010, 80 percent claimed to have taken actions to adopt new or improved farming practices in the past five years, up slightly from 78 percent in 2008 and in line with 79 percent in 2006. Table 13 also shows that 89 percent of growers surveyed in 2010 were undertaking activities or initiatives to ensure the longer term sustainability of their farms, up slightly from 86 percent in 2008, and unchanged from 89 percent of growers surveyed in 2006. The GRDC continues to be a major source of influence on the adoption of actions relating to longer term sustainability of farms, as 49 percent of growers said their actions were in some way the result of GRDC activities or GRDC-supported projects.

TABLE 13:
Adoption levels of specific farm management practices and technologies, by proportion of growers surveyed (percent)

Key performance indicator	2004	2005	2006	2008	2010
Specific practice change					
Growers improving soil condition, as indicated by the increased use of:					
• lime	40	41	39	42	48
• gypsum	51	48	49	53	44
• controlled traffic	15	24	20	30	22
Growers managing nutrients and minimising nutrient loss increases, as indicated by the increased use of:					
• nutrient budgeting	66	63	54	59	50
• variable rate technology	16	16	20	20	20
Growers taking up precision agriculture and related practices	36	44	48	65	77
Growers adopting new or different management practices to actively manage climate variability[a]	n/a	n/a	53	64	60
Growers monitoring 'plant available' water in the soil	33	33	32	35	28
Growers monitoring depth to the water table	27	28	24	26	22
Growers with improved confidence in managing:					
• weeds	84	81	86	86	84
• pests	73	71	79	70	70
• diseases	78	78	82	78	82
On-farm change and GRDC influence					
Growers adopting new or improved farming practices in the past five years	82	78	79	78	79
Growers adopting actions to ensure longer term sustainability of farm	92	88	89	86	89
Growers adopting actions to ensure longer term sustainability of farm as a result of GRDC-specific activities or initiatives	40	40	45	40	49
Growers influenced in a major way by GRDC information in motivating change on farm	21	21	18	30	42

a This measure was introduced in 2006.
Note: The survey was suspended in 2007 as part of the GRDC's drought response and is now conducted every second year.
Source: GRDC Grower Surveys, 2004 to 2010.

TABLE 14:

Practices overview

OUTPUT GROUP 1—PRACTICES

Objective

Better practices developed and adopted faster

Strategies

Identify and develop profitable, innovative and integrated practices and technologies

Ensure active grain grower involvement and commitment

Undertake targeted extension and adoption through appropriate delivery channels

Enhance sustainable management of natural resources

Investment budget for 2009–10

$48.99 million

Performance for 2009–10

Performance indicators	Targets	Achievements
Identify and develop profitable, innovative and integrated practices and technologies		
Effective management of weed, disease and insect biosecurity risks	New approaches to integrated disease and pest management for use by grain growers, with a focus on surveillance and area-wide management.	Implementation of forecasting systems for stripe rust and wheat streak mosaic virus in Western Australia and blackspot in field peas in Western Australia and South Australia, delivered via web-based mapping.
	Implementation of the GRDC cereal rust management strategy and increased grower adoption of varieties meeting minimum disease resistance standards.	Agreement from an Australian Cereal Rust Control Program consultative committee, including breeders, to implement a national communications strategy to discourage production of wheat varieties susceptible to rust.
	Effective strategies for deploying suitable germplasm to minimise the risk of serious economic losses to the grains industry should an exotic pest or disease incursion occur.	Delivery of strategies for deployment of genetic resistance for Russian wheat aphid, barley stripe rust and stem rust (Ug99).
Nationally coordinated research and communication investments on integrated weed management	New approaches to integrated weed management with a focus on non-chemical weed control and herbicides with alternative modes of action.	Delivery of: • new approaches to weed seed bank management, including crop competition and competitive cultivars • research leading to herbicide label changes or acceptance of alternative modes of action.
	A path to market for weed seed destruction technology for use on grain harvesters.	Incorporation of validated field efficacy and performance data into a business plan for commercialisation of the Harrington Weed Seed Destructor.
	Grains industry engagement with the newly established Australian Weeds Research Centre.	Continued investment in the National Integrated Weed Management Initiative and engagement with the Department of Agriculture, Fisheries and Forestry on the potential Australian Weeds Research Centre.

TABLE 14:
Practices overview *(continued)*

Performance for 2009–10		
Performance indicators	**Targets**	**Achievements**
Ensure active grain grower involvement and commitment		
Expanded participatory action research program to involve growers, agribusiness networks and researchers in jointly developing comprehensive sustainable management solutions to farming challenges	Regional programs developed in partnership with growers, agribusiness, researchers and natural resource management bodies.	Gaining support for the second phase of the Grain and Graze program from growers, agribusiness, researchers, natural resource management bodies and the Australian Government's Caring for our Country initiative. Supporting workshops and consultation between the National Integrated Weed Management Initiative, the National Invertebrate Pest Initiative and the Department of Agriculture, Fisheries and Forestry about the future of the Australian Weeds Research Centre, to identify gaps in RD&E, collaborate with other research partners where relevant and inform future investment plans.
Undertake targeted extension and adoption through appropriate delivery channels		
Improved profiling of the GRDC customer relationship management database	Integration of new demographic and extension provider datasets into the GRDC customer relationship management system.	Full integration of Australian Bureau of Statistics and Australian Bureau of Agricultural and Resource Economics variables into the GRDC customer relationship management system.
Improved access for growers to technical workshops and training materials		Use of the system for key activities, including: • distribution of the GRDC investment plan, cereal variety guides, paddock diaries and Driving Agronomy • collection of publications.
Further development of mobile technologies for extension programs for growers	Continued rollout of final reports onto the GRDC website.	Addition of more than 30 final reports to the GRDC website. Commenced digitisation of hard copy final reports in preparation for application to the website.
Improved prioritisation of issue-based extension programs	Integration of climate, soil and production information.	Completion of the transfer of the Soil Health Knowledge Bank and Managing Climate Variability websites to the GRDC. Publication of canopy management workshop materials on the GRDC website. Commencement of grain storage extension training. Implementation of precision agriculture training, attended by more than 200 growers. Development of a training program for up-skilling extension providers. Scoping of a new two-day training workshop for grains advisers on cereal foliar disease management. Updating of phone numbers and e-mail addresses in preparation for SMS campaigns. Establishment of the Tasmanian Research Advisory Committee. Engagement with national and regional agribusiness reference groups to prioritise extension activities.

TABLE 14:
Practices overview *(continued)*

Performance for 2009–10		
Performance indicators	**Targets**	**Achievements**
Enhance sustainable management of natural resources		
Grain growers adapting to climate change and mitigating on-farm greenhouse gas emissions	Participation in the Climate Change Research Strategy for Primary Industries. Leadership of the nitrous oxide component of the Department of Agriculture, Fisheries and Forestry Climate Change R&D Program.	Membership of the Climate Change Research Strategy for Primary Industries (now hosted by the University of Melbourne). Management of the national nitrous oxide research program.
Coordinated national investment in nutrient management research, data management and communication	Inclusion of grain-growing soil information in the national soil database known as the Australian Soil Resource Information System (ASRIS). New investment in strategies to improve the efficiency of fertiliser use.	Development of a template to facilitate the entry of soil test calibration data and associated metadata for single-year trials into a national database. Establishment of a nutrient use efficiency initiative, including projects investigating the potential benefits of biochar.

What's in the RD&E pipeline for 2010–11?

- The adoption of a climate change communication strategy to ensure that knowledge, information and technology generated through research is provided to growers in preparation for the likely impacts of climate change.
- Crop breeding for improved water use efficiency.
- The extension of the Managing Climate Variability program to improve multi-week forecasting, seasonal forecasting and tools that apply climate information to crucial input decisions, such as Yield Prophet; and the online delivery of climate products, through the Bureau of Meteorology's Water and The Land website and the Climate Kelpie website.
- Research on water-repellent soil that will scope the scale of the problem and its impacts, review past work, consider what growers are doing, and identify management options and novel solutions that may be applied in the future.
- The launch of the second phase of the Grain and Graze program—a successful collaboration between the GRDC and other RDCs, farmer groups, research providers and regional management authorities—across seven mixed farming regions around Australia.
- Work by the Australian Glyphosate Sustainability Working Group to develop strategies to reduce the onset of glyphosate herbicide resistance in the grains industry by deploying alternative chemical and non-chemical management tactics.
- Work to improve
  - soil quality, through greater use of pulses and pastures in the farming system
  - water infiltration, through better understanding of non-wetting soils
  - nitrogen use efficiency, through better understanding of ammonia loss from surface-applied nitrogen fertiliser.
- Support for a large number of integrated pest management, disease management and weed management (including herbicide resistance management) projects.
- Work on identifying diseases through molecular diagnostics.
- The registration of minor-use chemistries for the grains industry.

Output Group 2—Varieties

The Varieties output group invests in gene discovery, functional genomics, grain quality research, plant pathology (where directly related to breeding), breeding technologies, genetic resources, germplasm enhancement, plant breeding, and crop variety testing across many of the 25 crops in the GRDC's R&D portfolio.

The output group supports crop improvement for growing domestic as well as export markets, with the aim of raising the overall value of the Australian grains industry. This involves developing new varieties with enhanced yields as well as quality attributes that add value and meet market demands, and includes collaborating with the grains industry to clarify consumer requirements.

Varieties also supports the search for new sources of disease resistance to incorporate into crops, as well as research to improve the understanding of the processes involved in resistance breakdown. It also invests to facilitate an industry-wide approach to improving data collection, for industry-good purposes and to increase the efficiency of end point royalty (EPR) collection.

Table 16 summarises the achievements of the Varieties output group against its performance indicators for 2009–10 and its objectives and strategies for 2007–12. The following sections describe some of the results of the output group's investments during the year.

CONTENTS

Wheat breeding

The GRDC is a shareholder in Australian Grain Technologies Pty Ltd, InterGrain Pty Ltd, and HRZ Wheats Pty Ltd—three of the four main commercial wheat-breeding programs in Australia. These programs performed well in 2009–10. Fewer varieties were released than in the previous years, signifying a growing maturity in the sector.

The GRDC also supports research to develop varieties for the specialised markets for dual-purpose wheat, particularly for growers in the high-rainfall zones of south-east Australia, and durum wheat.

Australian Grain Technologies

Australian Grain Technologies (AGT) was launched in 2002. The company's shareholders are the GRDC, the South Australian Research and Development Institute, the University of Adelaide, and Vilmorin & Cie (a subsidiary of the French company Groupe Limagrain).

AGT has a national wheat-breeding strategy, with nodes in northern New South Wales, South Australia, Victoria and Western Australia. While milling wheat is its main crop, the company also breeds durum wheat and triticale varieties. The triticale breeding is integrated into the National Triticale Breeding program with the University of Sydney and is supported by the GRDC.

During 2009–10 AGT released a new milling wheat variety, AGT Katana(Ф), and entered into exclusive marketing arrangements for the variety with CBH Grain. The variety Mace(Ф), released by AGT in Western Australia in 2008, received an Australian Hard classification in South Australia in 2009–10.

InterGrain

InterGrain was launched in October 2007 by the Government of Western Australia in conjunction with the GRDC. The company breeds bread wheat varieties for New South Wales, South Australia, Victoria and Western Australia, and has breeding programs for soft noodle and udon noodle wheat.

In 2009–10, InterGrain appointed two additional wheat breeders to its existing team of three, and released a new wheat variety, King Rock(Φ).

InterGrain's crop portfolio was significantly expanded in 2009–10 with the inclusion of the barley-breeding program formerly conducted by the Department of Agriculture and Food, Western Australia.

HRZ Wheats

HRZ Wheats was established in 2003 as a specialist breeder of milling-grade wheat varieties for the high-rainfall zone. The company's founding shareholders were CSIRO, the GRDC and New Zealand's Institute for Crop and Food Research (now known as New Zealand's Institute for Plant and Food Research).

In 2009–10, Landmark Operations Ltd joined the company as a new shareholder, adding commercial experience and focus and strengthening the resource base of the company. All new HRZ Wheats varieties will be commercialised through AWB Seeds.

CSIRO dual-purpose wheat program

The GRDC supports CSIRO's breeding program for dual-purpose (grazing and cropping) wheat. This program specialises in developing varieties for the high-rainfall zone of south-eastern Australia. One of its main objectives is to fast-track the commercial development of new varieties with resistance to barley yellow dwarf virus.

Drier than normal growing conditions over several years have slowed the selection process in Australia. Therefore, trials conducted in 2008–09 in New Zealand have proven useful for disease screening and for estimating yield potential.

Growers now have access to planting seed of Revenue(Φ), the program's latest variety release.

National Durum Wheat Improvement Program

In 2009–10, the National Durum Wheat Improvement Program continued to maximise operational synergies between its northern (Tamworth, New South Wales) and southern (Adelaide) breeding nodes by exchanging germplasm, communicating effectively and deploying a database across the whole program.

The program conducted several field trials across New South Wales, South Australia and Western Australia. Advanced breeding lines with higher yield potential than existing varieties were identified and are ready for commercialisation.

Improving durum quality is an important objective of the program. A modified early generation selection screen was implemented at the New South Wales node.

A pilot, glasshouse-based screening method for crown rot was developed and implemented at Tamworth.

The breeding program has commenced using molecular markers to screen for disease, quality, seed purity and agronomic traits.

Barley breeding

A review of Barley Breeding Australia (BBA) conducted in late 2008 recognised the potential for malting barley breeding to be economically viable in Australia. The review recommended that the western and southern nodes of BBA evolve to become self-sustaining breeding operations. The review also acknowledged that barley breeding for the Northern Region may require continued investment by the GRDC and its partners—the Department of Employment, Economic Development and Innovation, Queensland, and Industry and Investment New South Wales—for the short-to-medium term.

In 2009–10 the BBA Advisory Board accepted the findings of the review and began to implement its recommendations. As a result, the GRDC and the Department of Agriculture and Food, Western Australia, agreed to integrate the western node of BBA's program into the company InterGrain. The company has become a member of Barley Breeding Australia and will honour the obligations of the western breeding node to the national program until BBA winds up in 2011.

Oat breeding

The national oat-breeding program operates out of Adelaide, and has two nodes:

- the eastern node, which covers New South Wales, South Australia and Victoria and has technical staff at the South Australian Research and Development Institute
- the western node, which covers Western Australia and has technical staff at the Western Australian Department of Agriculture and Food.

The program's objective is to develop milling and hay varieties of oats.

In 2009–10 the program commercialised three oat varieties: Yallara(Φ) for milling purposes, and Mulgara(Φ) and Tungoo(Φ) for hay. Yallara(Φ) offers stem rust resistance and bright and plump grain quality that is preferred by the milling industry as well as fitting feed end-use in certain specialised situations. Mulgara(Φ) is a mid-season and Tungoo(Φ) is a medium-late season hay variety. Tungoo(Φ) offers excellent disease resistance, including stem nematode resistance and tolerance. Small quantities of seed are available to growers in 2010.

Pulse breeding

The GRDC invests in nine breeding programs for both temperate and summer pulses: chickpeas, field peas, faba beans, lentils, lupins, mung beans, soy beans, vetch and peanuts. The investment in these programs includes germplasm enhancement, breeding technologies, genetic resources, plant breeding and grain quality and pathology.

Five of the breeding programs for temperate pulses are delivered under the umbrella organisation Pulse Breeding Australia (PBA).

Pulse Breeding Australia

PBA was established in 2006 to enable five pulse-breeding programs (chickpeas, lentils, field peas, faba beans and lupins) to work together, sharing germplasm, technologies and intellectual property, to deliver better pulse varieties, faster. PBA has achieved greater collaboration and coordination, reduced duplication of resources and effort, and delivered to growers new varieties with better disease resistance, better adaptation to local conditions, and higher yields.

In 2009–10 the first five PBA varieties were released to growers. There is good evidence that the new varieties will improve returns to growers, according to a comparison of gross margins conducted by Industry and Investment New South Wales in 2009 for PBA, based on the results of disease resistance and productivity trials conducted in a variety of locations across New South Wales, Queensland, South Australia, Victoria and Western Australia. For instance, the chickpea PBA HatTrick(Φ) returned the highest gross margin while yielding basically the same as Yorker(Φ), while fewer fungicide sprays were required for PBA HatTrick(Φ).

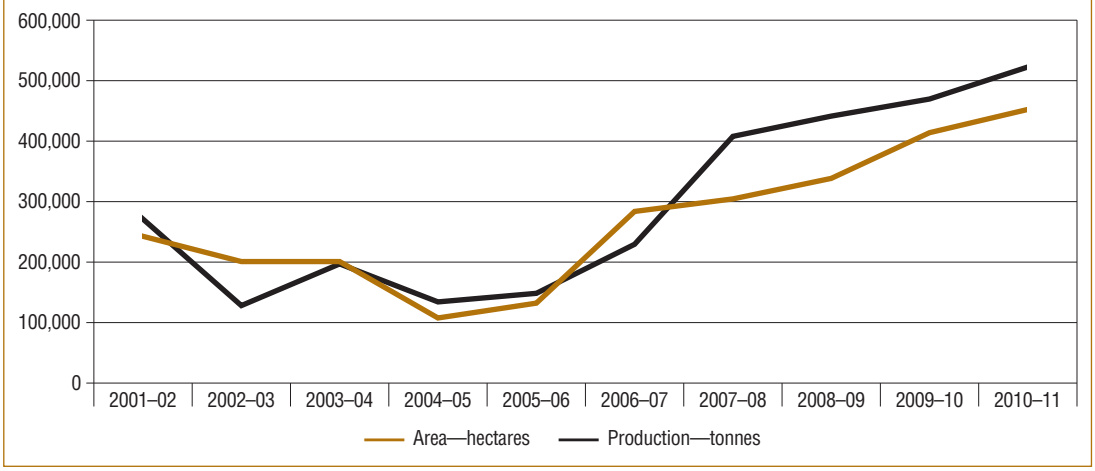
Chickpeas

Two chickpea varieties were released in 2009–10.

- PBA HatTrick(Φ) is suited to chickpea growing areas in northern New South Wales and southern Queensland. It is the first desi chickpea to combine moderate to high levels of resistance to the two key disease limitations in north-eastern Australia: ascochyta blight and phytophthora root rot. The release coincided with an increase in grower interest in chickpeas in the Northern Region, and all seed in the first release (approximately 5,000 tonnes) was sold.
- PBA Slasher(Φ) is suited to the chickpea-growing regions of southern New South Wales, South Australia, Victoria and Western Australia. PBA Slasher(Φ) provides a high-yielding desi alternative to small kabuli types. Its very good foliage resistance to ascochyta blight offers a low-risk desi variety option that can be sown early.

As Figure 11 shows, chickpea production in Australia has been expanding and is expected to grow strongly in 2010–11.

FIGURE 11:
Chickpea production from 2001–02 to forecast production 2010–11



Source: Australian Crop Forecasters Crop Report, May 2010.

Kristy Hobson (PBA chickpea breeder) and Muhammad Imtiaz (ICARDA chickpea breeder) with PBA Slasher(Þ) at the Paskeville pulse launch. *Photo: GRDC*

Lentils

Variable seasons, characterised by dry weather and climatic extremes, have had a significant effect on lentil profitability in the past ten years, but have also enabled multiple cycles of selection to be carried out in diverse and often stressed environments. PBA is developing new lentil varieties that will reduce the impact of climatic stressors such as drought and heat and potentially enable profitable production in most years. Two such varieties, PBA Flash(Þ) and PBA Bounty(Þ), were released in 2009–10.

PBA Bounty(Þ) is the highest yielding small, round-seeded red lentil variety. It is suited to all current lentil areas, where it has consistently yielded around 5 percent higher than the benchmark variety Nugget.

PBA Flash(Þ) is a medium red lentil particularly suited to shorter season areas where its high yield and earlier maturity improves reliability of yield, especially in lower yielding situations.

Faba beans

In 2009–10 the seed of several lines of faba beans was bulked up for release to growers. The first varieties in the pipeline for release will be available in 2010–11. These breeding lines included an ascochyta blight–resistant line with good adaptation for the lower south-east of South Australia, with excellent seed quality. Faba bean buyers in Egypt have shown considerable interest in the line.

Multiplication commenced in another two lines, with potential to be released in 2010–11, that have been reselected because of their resistance to ascochyta blight and uniformity of seed size and colour—important quality attributes required by overseas markets. The lines have increased yield of over 5 percent and 7 percent respectively compared to current varieties for the same target areas.

Within the PBA faba bean breeding program there is a small effort focused on broad beans. The broad bean PBA Kareema(Þ) was released in November 2009. Intended as a replacement for Aquadulce, PBA Kareema(Þ) has advantages in:

- improved disease resistance, especially for ascochyta blight
- better seed quality, with no evergreen seeds.

Peanut Company of Australia

Since 2007, the Australian peanut breeding program has been led by the Peanut Company of Australia, with significant investment and collaboration from the GRDC and the Queensland Department of Employment, Economic Development and Innovation. Its goal is to develop new cultivars with superior agronomic and quality traits that clearly differentiate Australian peanuts from their overseas competitors.

The program has a strong commercial focus and provides a solid foundation for the rapid and coordinated release of improved varieties that deliver value for peanut growers and meet specific market requirements. In 2009–10, one such variety was prepared for release to growers in 2010–11.

Germplasm exchange for oilseeds

In partnership with the ACIAR, the GRDC invested in a large project focused on exchanging and using germplasm from Australia, China and India to enhance the productivity of *Brassica napus* and *B. juncea* in all three countries. The project, led by the University of Melbourne, involved 13 institutes across the three countries. The project ran for five years from 2005.

As well as furthering the ACIAR's objective of assisting developing countries to improve skills and resources, the project was highly successful in achieving the overall aim of exchanging germplasm to enhance the productivity of canola. The long-term impact of the exchange will be seen in new cultivars that incorporate the new sources of disease resistance, agronomic traits, quality traits and drought tolerance traits that the project produced. The project also significantly contributed to enhanced long-term collaboration between scientists in the three countries.

Peanuts. *Photo: GRDC*

Pre-breeding in winter cereals

GRDC-supported pre-breeding researchers delivered several significant outputs in 2009–10, including the identification of a novel pathway for salinity tolerance, dissection of the genetic and biochemical basis of drought and cold tolerance, and establishment of pathways for the delivery of key traits to Australian breeding companies.

Australian Centre for Plant Functional Genomics

The GRDC-supported Australian Centre for Plant Functional Genomics continued to deliver outputs to industry from its research on drought, salinity and nutrient use efficiency, and to expand its network of research collaboration with Australian and international organisations. In 2009–10, the centre:

- launched breeding support activities that will assess the frequency of key alleles for drought and salinity tolerance at target loci in existing elite and breeders' germplasm and backcross these desirable loci into breeders' lines. This program has been established to validate major loci controlling tolerance and accelerate delivery of research to industry
- conducted field trials, in the Australian Capital Territory and South Australia, of wheat and barley lines engineered for enhanced nitrogen use efficiency
- obtained support from the European Union Seventh Framework Programme for a drought project coordinated by the French National Institute for Agricultural Research (INRA)
- established a new collaboration with the Chinese Academy of Agricultural Sciences, through the Consultative Group on International Agricultural Research's Generation Challenge Program, to explore natural variation in the expression of transcription factors related to drought tolerance in wheat and deploy desirable alleles in Chinese and Australian wheat germplasm
- identified a novel gene for salinity tolerance, from *Arabidopsis*, which is predicted to be part of a salt stress signalling pathway. Over-expression of the gene in both *Arabidopsis* and rice resulted in plants with lower levels of shoot sodium accumulation in the shoots.

Molecular Plant Breeding Cooperative Research Centre

The Molecular Plant Breeding Cooperative Research Centre completed its final year of operation in 2009–10.

Through the centre, the GRDC had investments in five diverse pre-breeding projects, with objectives ranging from the mapping of rust resistance genes in wheat to the development of breeding tools that enable breeders to predict the effects of yield and quality gene combinations 'in-silico'.

Among the projects' results in 2009–10:

- New molecular markers were developed for major phenological adaptation genes in wheat and barley.
- Progress was made on the fine mapping of the 2A rust resistance trait locus and yield, drought and salt tolerance quantitative trait loci in wheat, and on the development of closely linked markers.
- The effects of different combinations of photoperiod, height and vernalisation genes on yield in wheat were estimated, and the results were communicated to breeders.

CSIRO

In 2009–10, the results of GRDC-supported pre-breeding research projects conducted by CSIRO included:

- the development of wheat lines that enable Australian researchers to genetically dissect the relationship between frost tolerance and flowering time
- the mapping of a new adult plant resistance gene for leaf and stripe rust, and the delivery of new markers for the Sr2 stem rust resistance gene to Australian wheat breeders
- the identification of wheat germplasm that is more drought tolerant at the reproductive stage of plant growth. Analysis of this material has provided insights into the genes involved in drought- and cold-induced abortion of grain development, and delivered high-throughput screening methods to Australian breeders and pre-breeders.

Australian Winter Cereals Pre-breeding Alliance

The Australian Winter Cereals Pre-breeding Alliance is a forum representing Australia's major pre-breeding organisations and the GRDC.

The selection and commercialisation guidelines adopted by the alliance in 2008–09 have become a standard schedule to all wheat pre-breeding research agreements signed by the GRDC. The guidelines are designed to streamline the transfer of outputs from precompetitive pre-breeding into commercial breeding.

In 2009–10, a GRDC-funded position was created for an executive support person whose role it is to put in place communication channels—within the pre-breeding community and with the breeding community—that will empower the alliance to fully develop its potential. This will ensure that pre-breeding outputs are tailored to the needs of the industry and delivered in a timely way.

A workshop on drought-related projects, tailored for breeders, was held during Breeders' Week in March 2010. The workshop is a prime example of the mechanisms that the alliance is putting in place to update breeders on pre-breeding research outputs at different stages along the R&D pipeline.

Other projects to enhance winter cereals germplasm

Among other GRDC-supported work on germplasm enhancement, progress was made in the priority areas of crown rot resistance; salinity tolerance; and colour stability.

The GRDC-supported Crown Rot Initiative continued to work to refine resistance screening protocols for seedlings and adult plants. The aim is to enable regional comparisons and develop robust phenotyping protocols to be used in the development of molecular markers for breeding purposes.

GRDC-funded projects provided valuable insights into adaptation of wheat and barley to salinity stress. For example:

- A project carried out at the University of Tasmania showed that management of potassium at the cellular level may play a role as important as that of sodium ions.
- Researchers at the University of Adelaide developed methods to non-destructively quantify the effects of salinity on growth and senescence of lines of wheat, barley and *Triticum monococcum*. In combination with measurements of shoot sodium concentrations, this has allowed researchers to calculate a plant's osmotic tolerance and sodium tissue tolerance, in addition to measuring shoot sodium exclusion. The methods are being used to develop high-throughput technologies to map for quantitative trait loci linked to all three salinity tolerance mechanisms.
- The University of Adelaide group has also identified a candidate gene for salinity tolerance in barley, with some indications that the gene is involved in sequestering ions into the cell vacuole. Characterisation of the gene has commenced. Another barley gene is being investigated because it seems to be responsible for controlling the activation of sodium ion transporters.

- The projects at the University of Tasmania and the University of Adelaide both showed that multiple adaptation mechanisms can be stacked to produce plants better adapted to salt stress.

Colour stability is a highly desirable trait in Asian noodle markets. A significant component of noodle darkening can be attributed to polyphenol oxidase (PPO) activity. GRDC-supported research has developed germplasm with near-zero PPO levels, using synthetic hexaploid wheats processed by recurrent selection to produce lines without unfavourable agronomic traits of synthetics. The lines also lack late-maturity amylase activity, which is another valuable attribute in wheat classification. These lines were made available to Australian breeders in 2009 and in 2010, together with a very effective high-throughput, low-cost, non-destructive screening method and the appropriate molecular markers.

Darkening in noodles can also be attributed to non-PPO mechanisms, which appear to be associated with proteins found in wheat's starchy endosperm. GRDC-supported research has identified some possible contributors to non-PPO darkening; early observations will be validated in 2010 to determine the potential for cultivar improvement.

Molecular marker development

In 2009–10 the GRDC supported projects to develop molecular markers for use in breeding wheat, barley, canola and certain pulses (lentils, field peas, faba beans, chickpeas and lupins). Research priorities were determined in consultation with breeders, and project outputs were made available to all Australian breeding programs, public and private.

National Variety Trials

National Variety Trials (NVT) is a national program of comparative crop variety testing that includes standardised trial management and data generation, collection and dissemination. The program is funded by the GRDC and is managed by the Australian Crop Accreditation System Limited.

NVT was established to provide the Australian grains industry with access to robust, independent results on the performance of recently released crop varieties, based on trials conducted across Australia. All Australian winter cereal, pulse and canola breeders participate in the NVT program.

Trials

In the 2009 season, 626 trials were planted. Of these, 58 were abandoned due to unfavourable seasonal conditions, including drought and frost damage, and the results of a further 84 did not meet NVT's data quality requirements and were consequently not published. Results of the remaining 484 trials were analysed and delivered to grain growers through the NVT website (www.nvtonline.com.au) and the sowing guides published by state departments of agriculture.

NVT conducts dedicated trials to assess the performance of genetically modified (GM) canola varieties. In 2009, the program conducted 15 dedicated GM trials in New South Wales, Victoria and Western Australia. Of the 15 crops sown, 12 were harvested and 11 reported usable data.

Recently, the Western Australian Government approved an exemption order under the *Genetically Modified Crops Free Areas Act 2003* to permit cultivation of GM canola in Western Australia. In response to this decision, and to provide increased data on canola varietal performance to Western Australia growers, NVT has increased the number of Western Australian GM canola trials that will be planted in the 2010 season.

Enhancements

NVT was formally reviewed in 2008, to identify inherent strengths and weaknesses and develop a roadmap for the future structure and function of the program. Key recommendations of the review were implemented in 2009–10, including:

- the contracting of trial service providers for the next round of the program
- the establishment of 15 regional advisory committees, to provide a mechanism for industry input into the management of NVT trials and facilitate the dissemination of NVT results at a regional level.

In addition, the GRDC partnered with state departments of agriculture to deliver NVT data through departmental sowing guides. The *2010 NVT Queensland Wheat Varieties Guide*, the *2010 Farm Gross Margin Guide* and the *2010 South Australian Crop Harvest Report* were published through this partnership.

Pathway to market for genetically modified canola

In 2009–10, the GRDC commissioned a three-year benchmarking study to examine the economic, agronomic and environmental impacts of the implementation of GM herbicide-tolerant canola in the Australian cropping environment. Using a real-time analysis process, the project will investigate the adoption patterns of GM canola, and its effects on farmers, farming systems, the environment and the supply chain. An interim report, with results covering the 2008 and 2009 cropping seasons, will be published in late 2010.

CASE STUDY

Partnerships deliver better peanuts, faster

To give the Australian peanut a competitive edge over cheaper products from countries such as Argentina and China, the Australian peanut-breeding program focuses on developing new cultivars with superior agronomic and quality traits. Critical breeding targets include high oleic oil content, high blanchability, high kernel percentage (less shell), ultra-early maturity for improved drought resistance, and enhanced foliar resistance to fungal diseases.

Recently, the Australian peanut breeding program has significantly reduced the time it requires to develop new varieties. In the mid-1990s, the program required more than 13 years to develop a product from the initial cross to commercial release. In contrast, the program's latest variety, Tingoora(ϕ), will be released for the 2010 sowing season after only seven years in development. Figure 12 provides other examples.

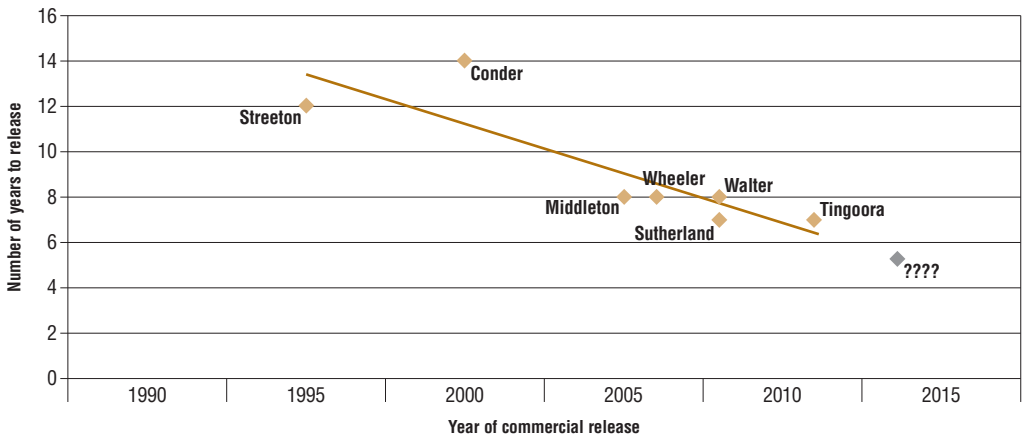
The use of winter nurseries in north Queensland and the Northern Territory has been a key factor in this improvement, almost halving the time required by the inbreeding, selection and regional testing phases of the program. The nurseries also allow breeders to maximise seed multiplication by producing larger quantities of seed. This strategy has saved nearly three years in the variety development program.

Closer collaboration between the breeding program and the company that delivers new varieties to market, the Peanut Company of Australia, has also been a key factor. In particular, this collaboration has equipped the program to take on greater commercial risk to enable the fast-tracking of commercial-scale seed increase.

Increasing the stock of seed to the quantity required for commercial release to growers—100 metric tonnes of seed—is a major hurdle for larger seeded plants, such as peanuts, for which low seed returns per generation are common. Fast-tracking seed increase (producing seed in quantities of up to 200 kilograms) for promising lines while they are still being tested can shave two or three years off the time taken to increase a new variety to commercial seed quantities.

The Australia peanut breeding program is now investigating 'speed breeding' techniques, using a 24-hour continuous light system, that significantly reduce generation time. Preliminary experiments have shown that generation time can be reduced from approximately 140 days to 85 days. The program is also exploring the potential of a single-seed descent breeding strategy that could save a year or two, reducing the initial cross to commercial release timeframe to only five or six years.

FIGURE 12:
Number of years from initial cross to commercial release for new peanut varieties, 1994 to 2011



Note: Solid diagonal line denotes regression equation for this relationship (y = -0.4275x + 866.25).

CASE STUDY

CAIGE is a one-stop shop for germplasm

Australian wheat breeders at a CAIGE-sponsored visit to ICARDA's Breda Station in Syria: (from left) John Sheppard (DPIF Qld), Gordon Cisar (Cornell University), Marie Appelbee (LongReach Plant Breeders), Richard Trethowan (University of Sydney), Russell Eastwood (AGT) and Francis Ogbonnaya (ICARDA). *Photo: Iain Barclay*

Demands on the characteristics of grains relate to differences in growing environment, pest and disease pressures and market requirements. Tailoring varieties to meet evolving demands can only occur if genetic diversity is maintained. An integrated coordination project is helping to ensure that the most appropriate germplasm for Australia is made available to Australian plant breeders.

A suite of projects under the title CIMMYT–Australian–ICARDA Germplasm Evaluation (CAIGE) is funded by the GRDC to promote and facilitate the uptake of diverse sources of germplasm from the collections at the Mexico-based International Maize and Wheat Improvement Center (CIMMYT) and the International Center for Agricultural Research in the Dry Areas (ICARDA) in Syria.

CAIGE coordinates the importation of appropriate material, the input of data into the Global Wheat Information System (GWIS), and the storage and distribution of material to Australian plant breeders. Approximately 1,000 new wheat accessions are brought to Australia each year through the CAIGE project.

An important global mandate for CIMMYT and ICARDA is to maintain rust resistance. Wheat lines with good rust resistance are distributed around the world for multiplication and safekeeping, and to provide source germplasm for the development of new varieties.

CAIGE ensures that selected germplasm arrives in Australia by November each year, so that material passes through quarantine in time to be distributed for multiplication the following autumn. The process takes 18 months between a seed's arrival and its entry into plot trials.

From 2010, 100 lines each of elite CIMMYT (most relevant to the Northern Region) and ICARDA (most relevant to Western and Southern regions) germplasm will be grown side-by-side and benchmarked against a selection of released Australian varieties. This will enable a comparison of the germplasm from the international organisations in Australian environments. The 200 lines will be fully genotyped and screened for local rust diseases at the Plant Breeding Institute at Cobbitty, New South Wales.

A core role of the CAIGE project is the distribution of international wheat material to Australian breeders for assessment within their breeding projects. The information generated through this evaluation is sent back and collated in the GWIS. In turn, it is used by breeders at CIMMYT and ICARDA to select the next accessions considered most suited to the needs of Australian wheat growers.

Through this overarching project that coordinates and records all incoming germplasm, a one-stop shop has been created for pre-breeders, breeders and researchers looking for germplasm with specific traits.

GROWER SURVEY Snapshot

Trends in the uptake of new varieties of the major crops are shown in Table 15. The uptake of new varieties of winter cereals and oilseeds increased in 2010, while the uptake of new pulse varieties fell by 10 percent to 23 percent. The proportion of growers who felt that new varieties met expectations was 57 percent, consistent with survey results achieved since 2005.

TABLE 15:
Uptake of new varieties, by proportion of growers surveyed (percent)

Key performance indicator	2004	2005	2006	2008	2010
Growers who had grown new varieties over the past five years:					
• wheat	76	72	71	67	75
• barley	42	41	41	40	47
• oats	24	22	18	23	24
• triticale	6	7	9	5	8
• pulses[a]	n/a	27	35	33	23
• oilseeds[a]	n/a	34	34	26	29
• sorghum (Northern Region only)	26	27	30	32	28
Growers who felt that new grain varieties met expectations[a]	n/a	58	59	58	57
Grower awareness of NVT[b]	n/a	n/a	54	73	79
NVT field days helped growers decide which varieties to adopt[c]	n/a	n/a	n/a	84	82
Information provided by the NVT program helped growers decide which varieties to adopt[d]	n/a	n/a	n/a	n/a	90

a These measures were introduced in 2005.
b This measure was introduced in 2006.
c This measure was introduced in 2008.
d This measure was introduced in 2010.
Note: The survey was suspended in 2007 as part of the GRDC's drought response and is now conducted every second year.
Source: GRDC Grower Surveys, 2004 to 2010.

Photo: Brad Collis

TABLE 16:
Varieties overview

OUTPUT GROUP 2—VARIETIES

Objective

Growers have access to superior varieties that enable them to effectively compete in global grain markets

Strategies

Build and sustain world-leading breeding programs

Focus pre-breeding research on key traits

Develop a path to market for genetically modified crops

Facilitate faster adoption of superior varieties

Investment budget for 2009–10

$45.53 million

Performance for 2009–10

Performance indicators	Targets	Achievements
Build and sustain world-leading breeding programs		
Average annual increase in yield (as measured in NVT trials) for wheat, barley, canola, sorghum and pulses	Average annual increase in yield (as measured in NVT trials) of: • 1.0% for wheat • 1.0% for barley • 1.5% for canola • 1.5% for sorghum • 2.0% for pulses. The release of improved varieties of wheat, barley, canola, pulses and summer coarse grains that benefit the Australian grains industry.	Release of: • four new wheat varieties • two new desi chickpea varieties • two new lentil varieties • one new broad bean variety. NVT trial results that showed: • the new wheat varieties yielded up to 12% more than current dominant varieties with comparable quality and disease resistance • the new barley varieties yielded up to 16% more than current dominant varieties.
Commercial breeding programs meeting minimum disease standards	90% of wheat second-year entries in NVT trials meet minimum disease standards for rust resistance. 90% of canola entries in NVT trials have blackleg resistance scores of 7 or above.	Trial results that showed 90% of wheat second-year entries (retentions) in NVT trials met current regional minimum disease standards for rust resistance. Blackleg ratings of 7 (moderately resistant) or above for over 90% of the canola varieties that were released in 2009–10 and were targeted at blackleg-prone areas.
Efficient and cost-effective royalty collection systems in place	End point royalty and seed royalty compliance is greater than 80% nationally.	Agreement from 32 traders during the 2009–10 harvest to make end point royalty deductions and/or provide collection data on behalf of end point royalty managers.

TABLE 16:
Varieties overview *(continued)*

Performance for 2009–10		
Performance indicators	**Targets**	**Achievements**
Focus pre-breeding research on key traits		
Nationally coordinated pre-breeding research with a focus on agreed key traits and effective international linkages	New traits and selection methods developed for use by Australian breeding programs.	Increase in Pulse Breeding Australia's international linkages, particularly in the development of molecular markers. Evaluation of frost tolerance of pulse germplasm from the Australian Temperate Field Crops Collection and international sources, leading to the identification of tolerant and intolerant gene pools in field peas, lentils and chickpeas, and the incorporation of some field pea lines into the breeding program. A workshop held to identify barriers to frost pre-breeding research progress, identify opportunities for future research and develop a national strategy for research coordination and collaboration. This initiative involved the development of an international collaboration with the International Center for Agricultural Research in the Dry Areas to access potential sources of frost-tolerant cereal and pulse germplasm.
Evidence that genes, germplasm and enabling technologies developed in GRDC-supported pre-breeding research are being used in breeding programs	Effective extension and delivery mechanisms in place for pre-breeding outputs. Industry agreement on key traits for durum pre-breeding.	Use of nearly 200 sorghum lines by privately owned sorghum-breeding companies. Exchange of 210 lines of *Brassica napus* and *B. juncea* with China and India. Preparation of information packages on disease resistance, ready for incorporation into integrated pest management of sclerotinia and white rust in canola.
Develop a path to market for genetically modified crops		
Delivery platforms developed for genetically modified crops in Australia	Technical milestones achieved towards developing genetically modified herbicide-resistant lupins.	Trials of a number of different gene constructs on *Arabidopsis*, tobacco and lupins.
Facilitate faster adoption of superior varieties		
Increased use of NVT results by paid grower advisers	NVT results used by 80% of paid advisers to assist growers with variety selections.	Expansion of the delivery of NVT results through modifications to the NVT mailing list, enhancements to the NVT website and implementation of formal arrangements with state departments of agriculture to ensure the continued delivery of NVT data through sowing guides.
Breeder participation in NVT	At least 90% of relevant breeding programs participate in NVT.	Participation in NVT by all Australian cereal, pulse and canola breeders.

What's in the RD&E pipeline for 2010–11?

- The development of a barley pre-breeding strategy to ensure that pre-breeding research remains relevant and available to all barley breeders.
- The identification of genes that enable crops to tolerate heat, frost and drought, and breeding to increase the rate of adaptation of crops to climate change.
- Two new projects at the Australian National University that will focus on modifying the sequence and expression of target genes to improve the photosynthetic and water use capacities of wheat.
- Germplasm enhancement projects to
  - improve genetic resistance to wheat streak mosaic virus, crown rot and yellow spot in wheat
  - improve frost tolerance in wheat and barley
  - develop high salinity tolerance in winter cereals
  - identify the genetic and phenological basis of head loss in malting barley
  - identify molecular markers for specific maize diseases.
- Specific breeding projects to:
  - develop wheat varieties that have substantially higher yields and are better adapted to Australia's harsh environments than existing commercial varieties
  - increase the yield and improve the reliability of durum grain production
  - develop pulses with better adaptation to water-limited environments
  - develop herbicide-tolerant pulses.
- Through the Wheat Classification Council, ongoing work with the wheat industry to ensure that Australia's grain supply chains meet the expectations of domestic and overseas markets.

The former head of the Molecular Plant Breeding CRC, Glenn Tong, with GM wheat trials at the Victorian AgriBiosciences Centre.
Photo: Gio Braidotti

Output Group 3—New Products

The New Products output group comprises New Grain Products and New Farm Products and Services. The two investment areas target opportunities both pre-farm gate and post-farm gate, by investing in research, development and commercialisation to provide growers with additional options in farm management and marketing.

To achieve its objective, the output group actively identifies national and international technology relevant to the Australian grains industry; builds partnerships to develop products and services and deliver them to growers; undertakes product development to meet market requirements; and develops robust business cases that demonstrate the market demand for and value of any product or service that the GRDC and its partners propose to invest in.

Table 17 summarises the achievements of the New Products output group against its performance measures for 2009–10 and its objectives and strategies for 2007–12. The following sections describe some of the results of the output group's investments during the year.

CONTENTS

New grain products

The New Grain Products portfolio identifies investment opportunities that increase the value or attractiveness to customers of Australian grain for use in products for human consumption, animal consumption and bio-based industries.

Food products

Current GRDC investments in new grain food products focus on the development and commercialisation of novel grains with additional health benefits for easy incorporation into grain-based foods.

Through the Arista Cereal Technologies Pty Ltd joint venture, in 2009–10 the GRDC engaged with partners in North America and Australia to progress the commercialisation of high-amylose wheat. High-amylose wheat produces a high level of resistant starch, which is important in bowel health, and has a lower glycaemic index than other starches, which has benefits for stabilising blood sugar levels.

The GRDC also continued development of 'ultra-low gluten' barley, a cereal grain that could be safely consumed by people with coeliac disease. Through conventional breeding approaches, the project has developed barley lines that are essentially gluten free. In 2009–10, the project entered into an agreement with a commercial food company to evaluate the performance of the ultra-low gluten barley in food products.

Go Grains

Well established as 'Australia's leading independent voice for grain foods and legumes in health and nutrition', Go Grains Health & Nutrition Limited (Go Grains) communicates the nutrition and health benefits of grains and legumes to health professionals, food manufacturers and public policy makers. The GRDC is a foundation member of Go Grains.

In 2009–10, Go Grains launched *The Grains and Legumes Health Report*, which reviews the latest scientific evidence on the health benefits of grains and legumes. The studies in the report show that wholegrain foods, such as wholegrain bread and pasta, could make a significant contribution to preventing serious and costly diseases such as heart disease, diabetes and certain cancers.

Feed products

The GRDC has a number of investments that aim to increase the digestibility and energy availability of sorghum for use in poultry and pig feeds. In 2009–10:

- Joint projects with the Pork Cooperative Research Centre identified sorghum germplasm with increased energy availability; research was undertaken to identify its molecular basis so that markers can be developed for use in breeding programs.
- A project at the University of Melbourne identified a number of enzymes that could be added during processing to improve the digestibility of sorghum.

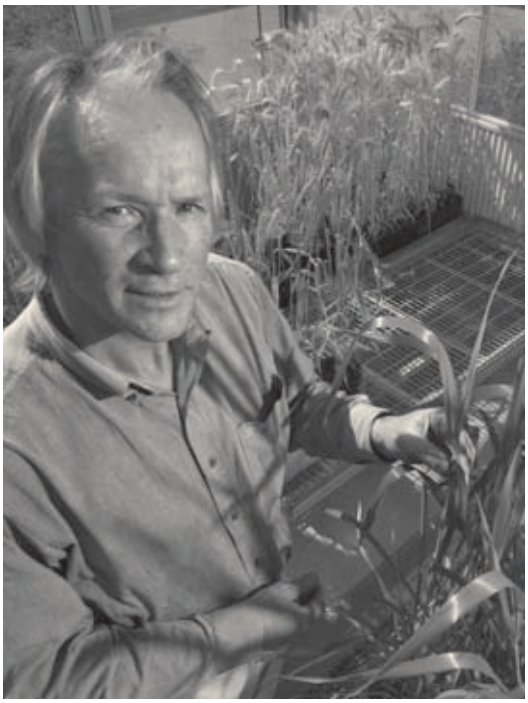
The GRDC is also collaborating with CSIRO to develop omega 3 canola oil. The primary market for the oil will be in the aquaculture feed industry, where the oil may replace fishmeal, particularly for farmed salmon. The project achieved a significant milestone during 2009–10, by successfully transferring the previously developed technology from a model plant into canola and generating transgenic canola plants with omega 3 fatty acids in the seed oil.

Industrial uses

The GRDC's grain for industrial use portfolio seeks to identify opportunities for the use of Australian grains for both existing and innovative industrial purposes that use materials derived from living organisms.

The Crop Biofactories Initiative is a joint investment between the GRDC and CSIRO that aims to engineer safflower seeds with fatty acid compositions that match specific industrial applications, to replace products that are currently manufactured from petrochemical feedstock or unsustainably produced plant oils such as palm oil.

The Crop Biofactories Initiative achieved a number of significant milestones in 2009–10, including the generation of its first transgenic safflower plants with altered oil composition. Informed by a review of the program, which included a review of the technical progress, competitive landscape and market data, the Crop Biofactories Initiative is confident that the first two products it aims to deliver will be commercially viable.



Richard Richards, CSIRO Plant Industry. *Photo: Brad Collis*

The GRDC also contracted a new project with the University of Sydney to develop novel, high-efficiency, hot-compressed water technology for use in manufacturing value-added transport fuels and industrial chemicals from grain stubbles. This feasibility study is complemented by another investment with CSIRO that is exploring the trade-offs of removing cereal stubble from farm systems for use in biofuel and bioenergy production.

The GRDC is also working with CSIRO to capitalise on an exciting yield enhancement discovery for cereals by supporting field trials and research into the characterisation of the genetics, and negotiating with companies that are interested in entering into licensing arrangements for the technology.

New farm products and services

The new farm products and services portfolio seeks to identify technology and intellectual property that can be developed and brought to market to assist the productivity of Australian grain growers.

Pesticides

The development of new pesticidal actives is a high-risk area for investment, and the GRDC invests in projects that are specifically tailored to address the risks. Usually, one or more of these three strategies is adopted:

- the project begins with a short (9–12 month) feasibility study that determines whether it will proceed (known as 'fast-track or fast fail')
- maximum financial leverage is sought in early stages of the project, to minimise exposure and increase opportunities
- as the project progresses, commercial partnerships are sought to ensure that the path to market is clearly defined.

Among the GRDC's portfolio of investments to design novel products that are effective against pest species and diseases, the most advanced technology is the biological control product for snails being developed in partnership with Charles Sturt University. The GRDC's new commitments in this portfolio in 2009–10 included:

- projects with the South Australian Research and Development Institute to assess potential new fungicidal actives
- an extension to the novel herbicide discovery program at Charles Sturt University
- a research agreement with the Scottish Agricultural College to investigate the potential use of biopolymers as fungicides.

The Harrington Weed Seed Destructor is not a 'silver bullet' but crushes weed seeds at harvest, allowing growers to use non-chemical weed control as part of the integrated weed management package. *Photo: Nicole Baxter, CORTEXT*

Engineering

In late 2009, the Harrington Weed Seed Destructor (HWSD) Prototype 2.1 was tested in cereal crops around Kojonup, Western Australia.

This trail-behind harvester attachment has created considerable excitement with its ability to reduce the amount of weed seed returned to the field at harvest and thereby dramatically decrease weed numbers in the following season. First designed by an individual grain grower from Kojonup, the HWSD has undergone several years of refinement and field trials through the Western Australian Herbicide Resistance Initiative, with GRDC support.

The University of South Australia is further developing the concept behind the HWSD through research to examine the effectiveness of weed seed destruction and how it can be improved.

Soil biology

The Soil Biology Initiative Generation 2 was developed as a joint strategy between the GRDC's Practices and New Products lines of business. A workshop held in late 2008 provided the framework for the investment sought in 2009–10.

New Products focused on and contracted two projects within the initiative, both aimed at delivering commercial outcomes:

- a project at the University of Sydney to improve the delivery of microbial inoculants through enhanced formulation and application technologies
- the Beneficial Microbes Program, a consortium of research groups focused on screening new potential inoculant strains to combat soil-borne diseases such as *Pythium* and *Rhizoctonia*.

For the 2010 winter cropping season, the Novozymes Biologicals Australia Pty Ltd joint venture made the first sales of its growth-enhancing JumpStart® phosphorus solubilisation product for use on cereals and canola. This joint venture was also responsible for the TagTeam® product, containing the same active and rhizobia for use on pulses, that was released in 2009. The phosphorus solubilisation active in both products is the CSIRO-developed *Penicillium bilaii.*

Export opportunities

The GRDC strategy for optimising export opportunities is focused on developing technology or knowledge that provides or defines a unique selling advantage for Australian grain in key export markets, emphasising new projects that have the potential to increase Australia's share in Asian markets.

In 2008–09, a GRDC delegation that visited China identified an excellent opportunity to work with Chinese researchers and millers to assess Australian wheat for blending into premium noodle and steamed-bread flours. After an assessment of the cost and impact of such work, a new project was contracted in 2009–10 to take advantage of this opportunity. The GRDC's relationships with importers and millers in China will play a vital part in ensuring the research done though this project has practical results.

Capacity building

In 2009–10 the New Products team adopted a coordinated approach to build capacity within key areas of its portfolio, including engineering, cereal chemistry, entomology and stored-grain protection. Postgraduate scholarships have been incorporated into a number of projects, to leverage the contribution of highly skilled research partners and expose students to cutting-edge R&D and opportunities for career development. Research partners' interest in and enthusiasm for this more strategic approach to capacity building has been overwhelming.

CASE STUDY

Infrared spectroscopy prepares to go into the field

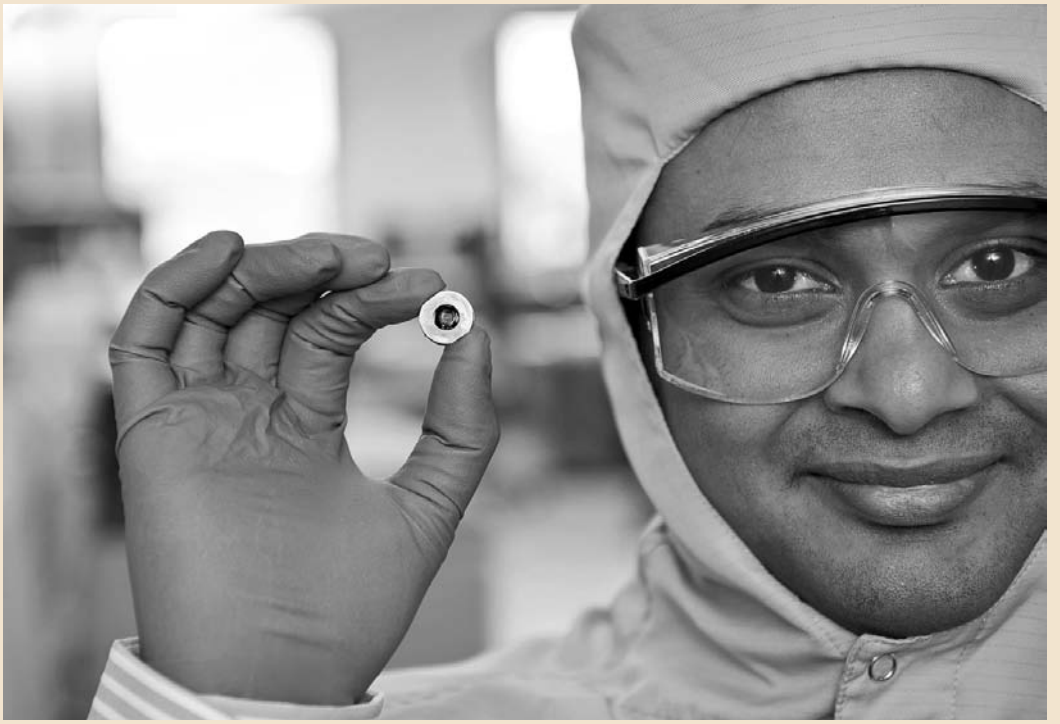
In many industries, infrared (IR) spectroscopy has become a standard technology for process control and material analysis. Detailed information can be obtained by measuring infrared spectra from complex samples, such as soil, grains or food processing mixtures, and comparing the measurements against appropriate spectral libraries. Examples of the measurable quantities that are important in agriculture include levels of protein, starch, oil and moisture content in grain, and total carbon and mineralisable nitrogen in soils.

Conventional benchtop spectrometers are the dominant tool in the analysis of material composition. These units are expensive and heavy, and require costly routine calibration and maintenance by experts. These obstacles have limited the use of IR spectroscopy in agriculture to the assessment of samples in facilities such as laboratories and grain depots.

A research project at the University of Western Australia aims to create a paradigm shift in this 40-year-old technology, by creating IR 'microspectrometers' that are small, cheap and robust. Microspectrometer IR technology will take the use of mid- and near-infrared spectroscopy from expensive, laboratory-based machines to a range of affordable field instruments that give real-time results.

Plans are underway to assess the application of the technology in handheld moisture/protein meters and probes for testing soil moisture and nutrient levels. In addition, a range of processing industries, from breweries to feed ration mills, have shown a strong interest in the technology's potential to support real-time processing control based on known IR calibrations.

The project began in mid-2008 and, having successfully navigated a number of technological hurdles, is currently evaluating the commercialisation pathway for IR microspectrometers.



Dilusha Silva with a microspectrometer, which could revolutionise farming. *Photo: Evan Collis*

CASE STUDY

Cooperation helps to safeguard stored grain

Photo: Brad Collis

A lot of effort is put into the growing of a crop, to produce the best quality grain for the particular end use. However, once the hard work of growing and harvesting is done, growers must remain vigilant to maintain the product of their hard work during storage.

Growers store grain on farm for a number of reasons, including strategic storage during harvest and storage of seed for the next year's planting. More and more growers are also storing grain on farm to take advantage of marketing opportunities that have been identified since the deregulation of the wheat export market.

The GRDC's goal is to invest in research projects that will assist growers to maintain the quality of their grain during storage so that it meets the requirements of the intended end use.

The GRDC's largest investment in grain storage is in the Post Harvest Integrity Program of the Cooperative Research Centre for National Plant Biosecurity. The program is a joint investment between the Australian Government, the GRDC and the bulk grain handling companies GrainCorp, Cooperative Bulk Handling and Viterra.

The investment partners have come together to tackle the most significant challenge in grain storage, which is to continue to supply insect-free grain in the face of increasing resistance to phosphine, the major fumigant used to treat grain in Australia.

The GRDC's investments in on-farm grain storage are focused on:

- improving on-farm storage practices—for example, using sealed storage structures, adopting aeration and cooling, and following appropriate fumigation procedures
- developing better tools to identify resistant insects and protocols to eradicate resistant insects
- finding alternatives to phosphine, including both chemical and non-chemical options.

TABLE 17:

New Products overview

OUTPUT GROUP 3—NEW PRODUCTS

Objective

Deliver new products and services (both on farm and off farm) that will assist growers to effectively compete in global grain markets

Strategies

Identify national and international technology relevant to the grains industry

Develop partnerships to deliver new technology

Undertake product development to meet market requirements

Build robust business cases that demonstrate stakeholder return on investment

Investment budget for 2009–10

$13.84 million

Performance for 2009–10

Performance indicators	Targets	Achievements
Identify national and international technology relevant to the grains industry		
Identify six new technologies and at least one new international supplier, including unsolicited offers	Joint review of the soil biology area with the Practices line of business, to contract projects that drive strategies developed in a soil biology scoping workshop held in December 2008.	Contracting of new projects within the Soil Biology Initiative Generation 2, including development of improved microbial formulations and a screening program for novel isolates for the control of soil-borne disease.
	Contracting of new projects to deliver new insecticides and fungicides based on spider toxins and biopolymers.	Contracting of the Scottish Agricultural College to investigate the potential of biopolymers.
	Completion of a survey report as the first stage of a waste-to-fertiliser project and a basis for decision on implementation of case studies.	Delivery of the survey report of the waste-to-fertiliser project, which will help scope the second phase of the project.
	Subject to evaluation of the business case, investment in a nitrogen use efficiency trait in wheat that would substantially reduce fertiliser requirements.	The business case for the nitrogen use efficiency trait recommended that the GRDC not proceed with this investment.
	Scoping of opportunities for the development of products to enhance water use efficiency in preparation for investment in July 2010.	Identification of a potential project for investment in 2011–12 through the Cooperative Research Centre for Polymers.
	A new project focusing on the development of enzymes to improve digestibility of sorghum, with the University of Melbourne.	Collaboration with the University of Melbourne and a commercial enzyme company to develop enzymes to increase sorghum digestibility.
	Scoping of potential research into the quality requirements of pulse processors on the Indian subcontinent in preparation for investment in July 2010.	A decision was made not to proceed with this scoping in 2009–10 as work was already being undertaken in the Varieties line of business.

TABLE 17:
New Products overview *(continued)*

Performance for 2009–10		
Performance indicators	**Targets**	**Achievements**
Identify national and international technology relevant to the grains industry *(continued)*		
Identify six new technologies and at least one new international supplier, including unsolicited offers *(continued)*	Support for the market research phase of the proposed Centre for Grain Food Innovation in Western Australia.	Support provided for: • the centre's work to gather market information for proposed processing technology • the placements of two PhD students at the centre.
	Completion of a review of the scientific literature and research landscape in relation to wheat sensitivity to identify potential research investment opportunities.	Completion of a review of the scientific literature in relation to wheat sensitivity, which revealed that the incidence of wheat avoidance could be as high as 10% among Australian consumers. A comprehensive survey to canvass consumer attitudes toward dietary carbohydrates was commissioned to explore the reasons why consumers are avoiding wheat.
Develop partnerships to deliver new technology		
Existing and new partnerships to deliver technology to growers	Commercial strategies and, where appropriate, engagement with commercial parties for: • outputs of the Crop Biofactories Initiative • coeliac-friendly barley • high-amylose wheat • fungal biopesticide.	Identification of the need for improved safflower germplasm as an essential component of the Crop Biofactories Initiative commercialisation strategy, and scoping of a safflower germplasm introduction program. Evaluation of ultra-low gluten barley malt in commercial-scale brewing facilities. Engagement of potential partners in North America for the commercialisation of high-amylose wheat, through the Arista Cereal Technologies Pty Ltd joint venture. Assessment, by a commercial partner, of the viability of the fungal biopesticides strains in production.
	Engagement of key commercial partners for the final phase (registration and market delivery) of the GLO2 grain fumigant project.	Identification of a range of potential partners, and commencement of negotiations, for the commercialisation of the new fumigant GLO2.
	Commercialisation of NIR calibrations for grain digestibility, with the Pork CRC Ltd.	Availability of the NIR calibrations through AusScan, and licensing of the calibrations by the major feed ration mills and feed mills vertically integrated with animal production.
	Development of joint projects with the cross-RDC feed grain partnership.	Identification of a number of collaborative communication and extension activities to raise the profile of the feed grain market among grain growers through the feed grain partnership between RDCs.
	Development of a new beneficial microbial pipeline, based on commercial and research collaboration.	A multiparty agreement with CSIRO, Flinders University, Murdoch University and the South Australian Research and Development Institute, to deliver the new Beneficial Microbes Program.
	Licensing of a wheat yield gene to commercial partners for development in other crops.	Identification of potential partners, through an expression of interest process, and commencement of negotiations for licensing of the wheat yield gene.

TABLE 17:
New Products overview *(continued)*

Performance for 2009–10		
Performance indicators	**Targets**	**Achievements**
Undertake product development to meet market requirements		
New products identified and market assessments undertaken and new products tested under market conditions	A commercial licence for *Metarhizium* isolates, following successful trials under the current research licence.	Commencement of negotiations with a potential partner to license the *Metarhizium* strains.
	First field trials of nematode isolates to evaluate efficacy in controlling snail populations.	Contracting of CSIRO to investigate ways of using snail attractants to improve baits.
	Contracting of a snail bait improvement project as part of the snail biocontrol strategy.	Contracting of the project with CSIRO.
	Investigation of a potential collaborative project using isolates (*Metarhizium* and *Beauveria*) targeting key sucking insects, with the Cotton RDC.	Commencement of a new *Metarhizium* project with Charles Sturt University.
	Continuation of the development and maintenance of NIR feed calibrations.	Contracting of research projects with the Pork CRC to maintain the reference samples and to improve the accuracy of the NIR calibrations.
	Commercial launch of new products by the joint venture company Novozymes Biologicals Australia Pty Ltd and Novozymes Biologicals of Canada.	Launching of JumpStart®, the phosphorous-solubilising microbial product for cereals and canola, for the 2010 sowing season.
Build robust business cases that demonstrate stakeholder return on investment		
Development of robust business cases to justify GRDC investment and to attract co-investment	Publication of a strategy paper on 'The role and importance of nitrogen fixation in farming systems, present and future'.	An approach made suggesting the National Rhizobium Program produce a strategy paper as part of its new communication program.
	Contracting of a Chinese noodle project in line with recommendations from a business case.	Contracting of a project to investigate how the inclusion of Australian wheat can improve the quality of Chinese noodles and steamed breads.

CRC = cooperative research centre, NIR = near-infrared, RDC = rural R&D corporation

What's in the RD&E pipeline for 2010–11?

> New and ongoing projects investigating
- the registration of minor-use chemistries for the grains industry
- new ways to produce fertiliser that are cheaper and more energy efficient and environmentally sustainable than current fertiliser production
- a range of new technologies, for on-farm and commercial use, for their potential to control or eradicate insect pests of stored grain
- the development of a probe for rapid on-farm soil testing, to enable the cost-effective, real-time collection of moisture and nutrient data.

> Work to establish a national quality assurance system to improve industry confidence in microbial products, such as soil inoculants, and thereby promote their use in agriculture.

Output Group 4—Communication & Capacity Building

The GRDC provides strength and security to the grains industry through continued investment in RD&E to ensure Australian grain growers are profitable and innovative. The benefits from GRDC investment flow through to Australian grain growers, the wider industry and the general community.

It is important that the GRDC demonstrates that it is a leader in rural RD&E, it is good value for money, and it is achieving its primary objective of increasing grower profitability through its strategic investments.

Through a range of communication activities, the Communication & Capacity Building output group positions the GRDC and its research partners as a credible source of technical and industry-specific information. It invests in a range of programs to enhance awareness and adoption of the outcomes of GRDC investments.

In consultation with the other output groups, Communication & Capacity Building identifies opportunities to produce high-quality, reliable publications and products that meet grains industry needs. Australian grain growers are a diverse audience, and their information needs and preferred delivery mechanisms vary. The output group packages and delivers timely and targeted information to satisfy the different demands.

The output group takes part in joint activities with research partners, government agencies and industry bodies, recognising the important role they play in influencing on-farm decision making. Such collaboration ensures that the GRDC can optimise the dissemination of new information.

Communication & Capacity Building also supports initiatives to encourage and develop capacity in education, training and technology transfer for researchers and the wider industry.

Table 19 summarises the achievements of the Communication & Capacity Building output group against its performance measures for 2009–10 and its objectives and strategies for 2007–12. The following sections describe some of the results of the output group's work during the year.

CONTENTS

Communication campaigns

It is important that stakeholders understand the GRDC's role in rural R&D, how it provides value for stakeholders, and how it delivers on its primary objective of increasing grower profitability through its strategic investments. To achieve this understanding, the GRDC communicates with a range of customer groups, including governments, research partners, grains industry bodies, growers and other industry participants.

During 2009–10, the GRDC developed a more integrated regional and national approach to investment in communication activities demonstrating the significance of the GRDC's investments to stakeholders. This was complemented by the development and implementation of three national issues-based campaigns, targeting growers and other industry segments, and several region-specific campaigns.

The three national communication campaigns were:

- the National Productivity and Profitability Campaign, aimed at increasing awareness of the GRDC's investments and understanding of their role in driving productivity gains and increasing grower profitability
- the National Climate Change Campaign, aimed at ensuring that growers understand climate change impacts so that they can minimise risk and maximise opportunities—the campaign supports the four strategies outlined in the GRDC's Environmental Plan, which need effective communication to achieve their goal of 'prosperous growers in a respected and sustainable industry'
- a campaign focused on communicating the GRDC's wheat-breeding strategy to improve grower understanding of the recent significant changes to wheat breeding in Australia.

Working closely with its regional panels, the GRDC developed regional issues-based campaigns with a focus on crown rot and nematodes in the Northern Region, non-wetting soils and frost in the Western Region, and nematodes and rhizoctonia in the Southern Region.

Media

Communication plays a crucial part in the adoption of new technologies and practices. Editorial coverage is a cost-effective and credible method of communicating key messages to target audiences. The crop production cycle provides a framework for media activities to ensure that information is delivered when it can be of most benefit to growers.

In 2009–10 the GRDC distributed 420 media products to inform growers of GRDC investment outcomes, encourage action on pest and disease management, increase awareness of farming practice changes, and invite growers to attend a range of updates, workshops and conferences.

The GRDC has contracts with professional communicators in each of the three GRDC regions. Each regional communicator writes and distributes weekly press releases, Crop Doctor columns (timely agronomic information to growers) and Grain Flashes (news briefs or snippets), as well as providing articles to agricultural magazines and newspapers.

A snapshot of the regional communication carried out in each of the GRDC's three regions shows that:

- In the Northern Region, key topical issues such as stripe rust, crown rot, cereal diseases, precision agriculture, new legume varieties and frost were covered.
- The Southern Region coverage included fertiliser and water use efficiency, crop canopy management, season 2010 preparation, grain storage, precision agriculture, crop nutrition, stripe rust and stem rust, blackspot, ascochyta blight, aphids, locusts, mice, integrated pest management, herbicide resistance, integrated weed management, NVT, spray drift management, harvest safety and climate change.
- In the Western Region, key topical issues such as frost, herbicide resistance, pre-seeding/seeding research, precision agriculture, crop nutrition, no-till, plant breeding/pre-breeding, canola, crop diseases and water use efficiency were covered.

Information packages

In 2009–10, emphasis continued to be placed on the packaging and delivery of the most recent research results relevant to grower needs. The GRDC focuses on ensuring that information is available in readily accessible and user-friendly formats to meet the needs of a diverse range of customers.

A new initiative, Ground Cover TV, was developed; a pilot program was produced and distributed as a DVD through the GRDC's *Ground Cover* newspaper.

A new package of products developed in the Over the Fence program included 26 print, audio and video media products targeted at rural press and online outlets.

Publications

Canola guide for south-eastern Australia

In 2009–10 the GRDC published a free guide to best practice management of canola, written by a team of agronomists and leading experts.

The 92-page guide covers topics ranging from grain quality, crop establishment and nutrition, disease, weed and pest management, through to grazing, fodder making, harvesting and marketing. It also includes a section on herbicide-tolerant varieties which allow canola to be grown in areas where it could not be grown previously.

The guide was distributed by the GRDC's Ground Cover Direct service to a large number of growers via extension staff in the departments of agriculture in New South Wales, South Australia and Victoria. A total of 12,323 copies were distributed, with over 1,005 individual orders received and in excess of 32 requests for bulk orders (ranging from 75 copies to 3,000 copies). There was unprecedented demand for copies from growers, advisers and other participants in the canola supply chain.

Fact sheets

In 2009–10, drawing on consultations with GRDC panel members, growers and industry representatives, the GRDC compiled a list of priority topics to be covered in the popular 'fact sheet' format.

To be able to capture issues in a timely manner, the GRDC retained the necessary flexibility to adjust the priorities to meet an immediate need. For example, in response to reports of high numbers of mice being recorded in many grain-growing areas in 2009–10, a fact sheet on mouse management was produced.

During the year, 26 free fact sheets were produced, of which 18 were of national relevance and eight were regionally focused. Topics included pests and diseases in various crops, canopy management, herbicide resistance, water use efficiency, recycled organic fertiliser and crop nutrition (the full series is listed in Appendix D).

Six fact sheets were distributed in the GRDC's bi-monthly newspaper, *Ground Cover*, and the remainder were uploaded onto the GRDC website and printed in limited numbers for distribution at GRDC Research Updates, workshops, field days, expos and industry events, and through agricultural and TAFE colleges.

Better Oilseeds Project

The Better Oilseeds Project was jointly supported by the Australian Oilseeds Federation and the GRDC. The aim of the project was to improve the skill levels of advisers and growers to assist them to produce oilseeds with reliable returns under Australian conditions.

Demonstration and field trials were established for canola, sunflower, soybean and safflower. The results of the trials, combined with case studies following growers' on-farm activities from sowing to harvesting, were presented in a series of publications: *Raising the Bar with Better Soybean Agronomy*, *Over the Bar with Better Canola Agronomy* and *Raising the Bar with Better Safflower Agronomy*. The booklets were made available free to growers and advisers; interest levels were very high, resulting in some titles being reprinted to meet grower and industry demand.

Ground Cover Direct

Ground Cover Direct, the GRDC's marketing and distribution arm for its suite of publications and products, has been in operation for seven years. In 2009–10 it distributed 69,280 items of which 65,808 were free of charge and 3,472 were sold.

The number of free publications that the GRDC publishes has almost doubled over the past two years. Fact sheets (26 separate titles published during 2009–10) were highly sought after by growers, advisers and agricultural educational institutions.

Ground Cover Direct attracted more than 709 new customers and, as expected, the large increase in free publications saw total sales revenue fall. The GRDC not only promotes its suite of products in the *Ground Cover* newspaper but also publishes two publication catalogues annually.

Ute guides

One of the most popular titles in the ute guide series, *Weeds: The Ute Guide (Version 2—Southern Region)* sold 433 copies in 2009–10; the unprecedented demand necessitated a reprint. In collaboration with PBA the GRDC published *Faba Bean: The Ute Guide*. This title completed the ute guide series for pulses, which includes *Lentil: The Ute Guide* and *Field Peas: The Ute Guide*. The GRDC also published *Vetch: The Ute Guide* in 2009–10.

GRDC awards and scholarships

The GRDC helps to build capacity in the Australian grains industry and related research disciplines by providing targeted awards and scholarships.

Education and training scholarships

The GRDC offers six categories of scholarships for financial assistance to Australian students, permanent residency students, Australian R&D personnel and overseas R&D personnel to enhance GRDC-funded projects, which may ultimately benefit the Australian grains industry. The scholarships awarded in 2009–10 are summarised in Table 18; more details are provided in Appendix B.

Travel Awards

The GRDC granted 24 Travel Awards in 2009–10 to grains industry individuals or small groups wishing to attend a conference or undertake travel that may ultimately benefit the Australian grains industry.

The GRDC places a high priority on the dissemination and communication of knowledge and learning outcomes gained from the experience offered by these awards.

Industry Development Awards

The GRDC granted 11 Industry Development Awards in 2009–10. These GRDC awards allow groups of Australian grain growers to take part in study tours or other forms of training that will help them to develop new skills, build relationships and contribute to the sustainability and profitability of the Australian grains industry.

Conference sponsorships

The GRDC sponsors organisations that wish to conduct a conference, workshop, seminar or field day that will directly benefit the Australian grains industry. Thirty-one events were sponsored in 2009–10.

Capacity-building collaborations

The GRDC collaborates with other organisations to leverage their individual contributions to more effectively build capacity across Australian primary industries, with particular benefits for the grains industry. In 2009–10 the GRDC's contribution included support for programs for high school students; research grants for university students, researchers and growers; and professional development opportunities for future leaders.

Programs for secondary school students

Primary Industry Centre for Science Education

The GRDC is part of the Primary Industry Centre for Science Education, a partnership funded by the Australian Government, universities, RDCs and primary industry bodies to attract students into tertiary science and increase the number of professionals in agribusiness and research institutions.

The program operates through eight activity centres around Australia, at which science educators work with teachers and students to explore agrifood science and career opportunities. It delivers class activities, teacher professional development, teaching resources, student camps and student industry placement programs.

TABLE 18:
Education and training scholarships granted in 2009–10

Title	Eligible candidates	Contract period	No.
Agricultural Training Awards (ATA)	Students undertaking full time study at a recognised vocational education and training provider institution	1 year	12
Grains Industry Undergraduate Honours Scholarships (UHS)	Students of excellence proceeding to undergraduate honours study in a field relevant to the future of the Australian grains industry	1 year	17
Grains Industry Research Scholarships (GIRS)	Students of excellence proceeding to postgraduate study in a field relevant to the future of the Australian grains industry	3 years	18
Grains Industry Senior Fellowships (SF)	Senior R&D personnel seeking to enhance their experience and potential to contribute to the work of the GRDC at an institution in Australia or overseas	1 year	1
Grains Industry In-Service Training Awards (IST)	Younger scientists, advisers, technical staff and others engaged in work relevant to GRDC objectives that may not be eligible for other forms of support—funding will be considered for travel, secondment or interchange between institutions	6 months	2
Grains Industry Visiting Fellowships (VF)	Overseas R&D personnel who are able to enhance programs supported by the GRDC with their specific skills	2–12 months	0

During 2009–10:

- the program's science education officers spoke to 7,529 students in year 11 or year 12 in 223 schools across Australia
- seven two-day professional personal development sessions were delivered, to a total of 199 science teachers—16 teachers were awarded GRDC scholarships to participate at interstate professional development sessions to expand and share their knowledge with other science teachers
- seven industry placement scholarship camps and placement programs were held, with 127 students participating. On a five-point scale, 98 percent of the students ranked their camp and placement as four or five points, an exceptional satisfaction rate. Sixteen students were awarded GRDC scholarships to participate in camps interstate.

National Youth Science Forum

The GRDC supports the National Youth Science Forum, which aims to encourage students from across Australia to enter science- or engineering-based university degrees and to explore associated careers. The experience involves presentations, debates, personal development sessions and visits to science, research and engineering facilities.

In 2009–10 the forum was expanded to encompass two 12-day intensive residential programs held at the Australian National University, Canberra, and one 12-day intensive residential program held at the University of Western Australia, involving a total of 432 year 12 science students.

Six GRDC staff and regional panel members gave presentations at the forum. Subjects included world hunger, the loss of arable land, and population trends, as well as information about their own journeys through agricultural science. Staff and panel members also held informal discussions with each of the student groups during the program.

The forum includes follow-up seminars and visits to various university campuses and industry sites around Australia, each involving between 50 and 150 students from the residential programs. Around 40 of the top students are selected for leadership development and take on the role of team leaders at the following year's forum.

BHP Billiton Science Awards

The GRDC has been a partner in the prestigious BHP Billiton Science Awards since 2007. The GRDC's aim in sponsoring the awards is to build capacity by providing incentives and recognition for students with potential to excel in Australian rural industries.

BHP Billiton, CSIRO and the Australian Science Teachers Association work with the science teachers' association in each state and territory to select finalists for the awards.

The GRDC Prize for Sustainable Agriculture in 2009–10, for the best entry related to agriculture with an environmental sustainability focus, was presented to James Francis, a year 10 student from Shore School in Sydney.

CSIRO undergraduate summer school

The GRDC is a sponsor of the CSIRO Plant Industry Summer Studentship Program. The program runs for ten weeks and is especially tailored for second- and third-year university students.

Each student works on a project alongside a CSIRO research scientist at one of CSIRO Plant Industry's sites, in Adelaide, Brisbane, Canberra, Narrabri (New South Wales) or Perth. Projects are designed to ensure students have the opportunity to learn new techniques and approaches, and to understand the importance of scientific research in the context of the delivery of practical outcomes. At the completion of the program, the students prepare final reports on their findings and present their results in a public forum.

Science and Innovation Awards for Young People

The GRDC is a sponsor of the Science and Innovation Awards for Young People in Agriculture, Fisheries and Forestry, coordinated by the Department of Agriculture, Fisheries and Forestry.

To qualify, applicants must be aged between 18 and 35 and working or studying in an agricultural, fisheries, food, forestry or mineral resources industry. Applicants are required to submit a proposal for an innovative project that could be completed within 12 months, and addresses a significant issue facing rural industries. Winners are selected from a competitive field from across Australia, based on their projects' potential benefit to Australia's rural industries.

In 2009–10 the GRDC-sponsored award was presented to Scott Cummins, a postdoctoral fellow at the University of Queensland, whose project investigated ecologically safe methods of pest control for snails.

Nuffield Australia Farming Scholarships

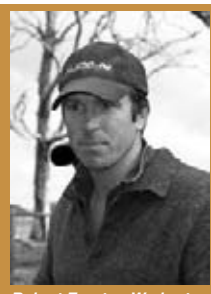
The GRDC supports the skill and leadership development of people working in the grains industry through its sponsorship of the Nuffield Australia Farming Scholarships.

These scholarships give Australian primary producers the opportunity to travel overseas to study a research topic related to farming practices in New Zealand, Europe, Asia or the Americas. The scholarships provide a better understanding of the forces shaping international trade policy in key markets, the issues behind consumer sentiment and the technological advances being made by producers overseas. The scholars are expected to actively spread the knowledge and understanding that they gain, to benefit their farming sector.

The 2009–10 GRDC scholars are:

- Stephen Ball, from the Gilbert Valley in South Australia's lower north region, who is investigating direct-seeding systems
- Robert Egerton-Warburton, from Kojonup in south-west Western Australia, who is researching integrated stock–cropping systems
- David Gooden, from Lockhart in southern New South Wales, who is investigating herbicide use in broadacre grain cropping
- Rowan Paulet, from Flynns Creek in south-east Victoria, who is studying the integration of livestock and cropping in high-rainfall zones
- Alastair Starritt, from Womboota in the southern Riverina district of New South Wales, who is researching soil carbon.


Stephen Ball


Robert Egerton-Warburton


David Gooden


Rowan Paulet


Alastair Starritt

Australian Rural Leadership Program

The GRDC supports the development of grains industry leaders through the Australian Rural Leadership Program. The program's objective is to produce a network of informed, capable and ethical leaders who are able to work collaboratively to advance the interests of their industries and communities and rural Australia in general.

The program is delivered over 18 months, during which participants attend seven sessions spread over 60 days, and accepts up to 35 people each year. Recognising the benefits of diversity, the program selects men and women, including Indigenous people, of various ages, from different employment backgrounds and from places with different climate and geographical conditions.

The GRDC-sponsored participants on the course commencing in 2009–10 were:

- David Mailer, from Uralla, New South Wales—David is a farmer with a passion for biofuels and the grains industry. He is a member of the New South Wales Farmers' Association, the Rural Fire Service, and the Southern New England Landcare Council.
- Sara Hely, from Canberra, Australian Capital Territory—Sara is the Project Manager Climate Change at the GRDC, and provides secretariat services to the Nitrous Oxide Research Committee and the Free Air CO2 Enrichment Steering Committee.


David Mailer


Sara Hely

CASE STUDY

Paddock diary grows to meet user needs

In 2009–10 the size and the format of the GRDC's popular paddock diary were totally revamped. After seeking advice through discussions with grain growers and road testing the new format, the GRDC published a 'new look' diary that included all the elements that growers had requested.

In particular, the new format provides:

- a larger page size (increased from DL to A5)
- colour-coded sections to help growers access their information quickly and easily
- an additional 20 pages in the recording and observation section of the diary, including an increase in the number of columns to assist growers in complying with the different state legislative requirements for the recording of on-farm chemical applications.

Due to the increased size and weight of the new version, the GRDC distributed the paddock diary separately by direct mail—to all growers in the Northern and Southern regions—rather than distributing it as an insert in the *Ground Cover* newspaper as was the practice in previous years.

CASE STUDY

Centre promotes agrifood science to secondary students

The Primary Industry Centre for Science Education uses funding from government, educational institutions and industry to reach large numbers of school students and encourage them to consider tertiary study and careers in science related to 'agrifood'— food, fibre and animal production and processing.

The major facets of the centre's program include:

- class presentations that expose students to cutting-edge scientific research and the exciting opportunities for science graduates in their region, with examples of the application of science in local primary industries
- a two-day program of teacher professional development that illustrates the connection between the science taught in class and the science used locally in primary industries and R&D organisations
- scholarships enabling selected year 11 and year 12 students to attend five-day industry science induction camps that involve in-depth consideration of career and research opportunities for science graduates—postgraduate students from local research institutions and scientists working in local primary industries provide assistance and input at the camps
- a five-day industry placement that allows scholarship students to join a team of scientists in a local industry or research organisation—at the end of the placement, each student provides a report to other scholarship students, industry and university mentors, and parents
- science teaching resources that integrate with secondary school science curricula and use practical examples linked to primary industry applications—different themes are chosen each year
- a camp for year 10 students, with a focus on connecting schools with primary industry research in local areas
- annual Science Investigation Award events—at each of the program's eight activity centres, students conduct science investigations and present the results, to be eligible for an award.

TABLE 19:

Communication & Capacity Building overview

OUTPUT GROUP 4—COMMUNICATION & CAPACITY BUILDING

Objective

Increase the awareness and capacity to optimise adoption of grains research outputs

Strategies

Ensure planned, targeted, measured communication

Coordinate a national approach to building industry and research capacity

Leverage delivery through partnerships

Develop demand-driven publications and products

Investment budget for 2009–10

$5.80 million

Performance for 2009–10

Performance indicators	Targets	Achievements
Ensure planned, targeted, measured communication		
Implementation of a revised GRDC communications strategy	Implementation of a GRDC communication strategy that identifies the needs of stakeholders, key messages and processes for evaluation.	Ongoing implementation of the GRDC Communication Strategy.
	Facilitation of delivery of research outputs to a wide audience, building on existing regional delivery channels.	Distribution of more than 420 media products on GRDC and research partner investments to media outlets throughout Australia.
Increased awareness of the GRDC and its research outcomes	National issues-based campaigns developed and implemented to increase awareness of priority issues including: • GRDC profitability and productivity objectives • the GRDC breeding strategy.	Implementation of three national issues-based communication campaigns focusing on: • productivity and profitability • climate change • the GRDC's role in wheat breeding. Engagement with the communication managers from other RDCs to ensure effective partnerships. Joint RDC participation at the National Farmers' Federation Congress and the Australian Bureau of Agricultural and Resource Economics Outlook conference. Collaboration on the joint RDC evaluation framework launch and media activities.
	Unaided awareness of the GRDC to increase through targeted communication activities (from 68% in 2006 to 90% in 2010).	Independent media analysis which showed that the volume of media coverage increased from 57% in 2008–09 to 72% in 2009–10.
	Increased understanding of the GRDC and its role as measured through independent research surveys.	Results of the grower survey which showed that 54% of growers surveyed in 2010 claimed to know a fair or considerable amount about the GRDC and its activities, up slightly from 53% in 2008, although growers' understanding of the GRDC's role appears to have fallen across most categories in 2010 compared to 2008.

TABLE 19:
Communication & Capacity Building overview *(continued)*

Performance for 2009–10		
Performance indicators	**Targets**	**Achievements**
Ensure planned, targeted, measured communication *(continued)*		
Increased awareness of the GRDC and its research outcomes *(continued)*	Publications, products and services that increase awareness of the GRDC's research outcomes in the Australian grains industry and wider community and reflect the needs of different target audiences.	Publication of six Ground Cover supplement titles, showcasing GRDC-supported research in the areas of: • water use efficiency • wheat breeding • pulse breeding • oilseed breeding • collaboration between rural R&D corporations • climate variability. Publication of seven research reports.
Delivery of a strategic media program focused on grower activity on-farm to ensure information is delivered when it can be of most benefit	Increase (over established benchmarks) in national media coverage of research activities and outputs for the GRDC and its research partners. Increase in favourable GRDC mentions in the media (over established benchmarks).	Increase in positive media coverage from 57% to 60%. Increase in the volume of favourable mentions coverage to 2,042 articles in 2009–10 from 1,976 articles in 2008–09, an increase of 3%.
Increased awareness and understanding of the role and function of the GRDC's regional panels	The proportion of growers who are aware of the GRDC's regional panels to increase to 65% by 2010.	Results of the grower survey which showed that 60% of growers surveyed in 2010 were aware of the GRDC's regional panels, and that growers' having interaction or direct contact with panel members remained steady at 23%.
Regular monitoring of current and emerging issues	Grains industry and corporate issues monitored and targeted communication tools developed to assist in the exchange of information and delivery of consistent messages.	Effective monitoring and management of issues management including the development of talking points, questions and answers and briefing papers.
Leverage delivery through partnerships		
Recognition of strong cooperative research partnerships	Increased favourable mentions of the GRDC's research activities and outputs and those of its research partners. Increase in positive media coverage (over established benchmarks) for print and electronic media. Establishment of a national grains communication network.	Increase in the volume of media coverage on GRDC research activities, to 2,592 press articles and broadcast reports in 2009–10, from 2,257 in 2008–09, an increase of 15%. Funding was not available for the implementation of this activity.
Increased collaboration in R&D communication and extension activities between the GRDC and research partners	Publication of materials in collaboration with RDCs, research partners, industry partners and government to meet grower and industry needs.	Publication of the *Communication: Sustaining Families on Farms* booklet, building on the popularity of *Succession Planning*, the first title in this series.

TABLE 19:
Communication & Capacity Building overview *(continued)*

Performance for 2009–10		
Performance indicators	**Targets**	**Achievements**
Leverage delivery through partnerships *(continued)*		
Increased collaboration in R&D communication and extension activities between the GRDC and research partners *(continued)*	Identification of opportunities for the GRDC to work collaboratively with other RDCs, research partners, industry partners and governments to deliver information in ways that reduce duplication, better target stakeholders and are more cost effective.	Collaboration with industry, research and government partners to produce publications such as: • South Australian Farm Gross Margin Guide • CliMag—Managing Climate Variability • South Australian Crop Harvest 2010 Report • NVT 2010 Queensland Wheat Variety Guide.
Develop demand-driven publications and products		
Enhanced information tools to account for industry issues and emerging technologies to enhance adoption by the grains industry and the wider community	Production of electronic media including audio, video and other electronically based content.	Ground Cover TV produced and distributed to all *Ground Cover* subscribers throughout Australia. Creation of a GRDC You Tube channel to capture and disseminate corporate video files. 42 Driving Agronomy segments produced and distributed to radio stations throughout Australia. Development of 26 Over the Fence media products including print, audio and video footage.
Coordinate a national approach to building industry and research capacity		
A nationally coordinated agricultural research capacity-building strategy	Key stakeholders understand the GRDC's capacity-building strategy.	Key information contained on the GRDC website. Communication strategy and talking points developed.
Support of a range of activities designed to build skills and expertise that will equip the Australian grains industry with the capacity to continuously innovate	Investment in industry-based awards, conferences and workshops to maximise targeted awareness of GRDC investment outcomes. Continued support for training awards, travel awards, conferences, Nuffield Australia Farming Scholarships and the Australian Rural Leadership Program.	Support for: • 24 Travel Awards • 11 Industry Development Awards • 50 new training scholarships, including 18 Grains Industry Research Scholarships and 17 Undergraduate Honours Scholarships • 31 conferences • five Nuffield Australia Farming Scholarships • two Australian Rural Leadership Program participants.

RDC = rural R&D corporation

PhD student and GRDC scholarship recipient Siem Siah exploring the antioxidants in faba beans.
Photo: Kellie Penfold

What's in the RD&E pipeline for 2010–11?

- Work to increase the exchange of knowledge between grower groups.
- Workshops on particular topics such as precision agriculture, irrigation in grains and wide row spacing/stubble management.
- Vavilov–Frankel Fellowships to support researchers from developing countries to conserve and use plant genetic resources.
- Sponsorships of events such as the National Youth Science Forum and grower representative organisation conferences.
- Examination of the potential to expand training opportunities to engage a wider selection of Indigenous people in the Australian grains industry.
- Support to assist individuals or small groups to improve their level of understanding of particular issues by attending a conference or travelling to acquire knowledge to benefit the Australian grains industry.
- National Partners in Grain, which delivers training and mentoring programs to develop leadership and business skills in women and young people in the Australian grains industry.

Senior nematologist Vivien Vanstone (right) and nematology technical officer Helen Hunter preparing root lesion nematode (RLN) cultures. *Photo: WA Agriculture Authority*

The GRDC's three enabling functions—Corporate Services, Corporate Strategy & Impact Assessment and Legal & Procurement—are responsible for key operational activities in relation to:

- corporate strategy
- information management systems
- corporate communication
- risk management
- quality management
- human resource management
- finance and administration
- corporate governance and legal services.

These activities provide essential support for the corporation's responsibilities under the *Primary Industries and Energy Research and Development Act 1989* (PIERD Act) and the *Commonwealth Authorities and Companies Act 1997* (CAC Act), and equip individual output groups to deliver their targeted outputs.

Outlined in this section, and throughout this annual report, are key activities undertaken by the Corporate Services, Corporate Strategy & Impact Assessment and Legal & Procurement groups during 2009–10.

Portfolio analysis

In 2009–10, the GRDC continued to undertake R&D portfolio analysis to provide more effective and efficient selection of investments.

One of the primary goals of the GRDC's portfolio management is to achieve a balanced portfolio of projects in terms of the following parameters:

- project type (strategic basic, applied, experimental development, extension, commercialisation and capacity building)
- delivery time to growers of R&D outcomes (long-term projects versus short)
- probability of overall success (high-risk long shots versus lower risk sure bets)
- level of expected on-farm benefits relative to investment required
- induced spillover benefits to industry
- level of expected benefits to be achieved for the broader community.

The GRDC's portfolio is grouped under 30 clusters. This enables groupings of projects around a common theme (for example, summer crops, crop protection, supply chain and markets) to be assessed generally, rather than have more than 860 individual projects examined independently.

These clusters have formed the basis of assessment of expected relative benefit flow:

- on-farm
- to industry
- to the broader community.

Clusters of projects are also commonly assessed for impact, rather than individual projects. Further information on the GRDC's program of impact assessments is provided in Part 2.

Different approaches are used to monitor, evaluate and manage projects, depending on project characteristics. For example, evaluation and management approaches for projects with standard GRDC research agreements are different from the approaches used to manage the GRDC's involvement in incorporated and unincorporated joint ventures.

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 2009–10 included around 860 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 timeframes for a limited number of formal reviews of targeted investment areas. Two formal reviews were conducted in 2009–10, covering the Australian Centre for Necrotrophic Fungal Pathogens and the Western Australian Herbicide Resistance Initiative.

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 2009–10 included:

- financial audits of a selected group of projects
- 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 the Board, management and staff.

Information technology

The GRDC's information technology (IT) environment continues to be virtualised in an effort to optimise hardware investments and reduce electricity consumption. The second phase has seen the implementation of an internal testing environment that enables full production-level testing of IT changes before implementation for all users.

The Remote Access capabilities of the GRDC were enhanced during 2009–10. The implementation has improved remote access for all GRDC staff.

The rollout of Windows Vista was successfully completed. Testing for the new versions of Windows Server and Windows 7 is now underway, to ensure that GRDC staff remain up to date and productive through the use of the latest software capabilities.

The GRDC has successfully implemented its new customer relationship management database, replacing a Microsoft solution with a Sage solution. The new database greatly expands the GRDC's capabilities to communicate effectively, through market segmentation and cross-matching with records in the Clarity project management database.

Southern panel members: (from left) Andy Barr, David Shannon, Allan Mayfield, Alex Ford (NuFarm), Geoff Budd, Peter Schwarz, Mark Peoples, Merna Curnow. *Photo: GRDC*

Commercialisation

The GRDC's primary aim is to make new technology available to grain growers as quickly and as cost-effectively as possible. In some cases, the benefits of GRDC research investments can be most efficiently delivered to growers through the commercial production of the research outputs. Commercialisation is a means of delivering technology to Australian grain growers so that they can effectively compete in global grain markets, and securing technology adoption.

Commercialisation strategy

The GRDC achieves its objective in commercialising research outputs through:

- ensuring commercialisation activities are aligned with the GRDC's four core strategies and are relevant to the strategies of the four output groups (Practices, Varieties, New Products and Communication & Capacity Building).
- leveraging capital and expertise from co-investors, to maximise opportunities to bring technology to the marketplace and give grain growers access to technology
- developing comprehensive business plans for delivering satisfactory returns to grain growers and investors.

As part of the overall commercialisation strategy, the GRDC recognises that the following are necessary for commercialisation: a sustainable market size, expertise, funds and distribution channels. 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 capacity, such as market knowledge and access to complementary technologies.

Where the GRDC is a member of a research 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 consortium.

While the most usual path to market for commercial research products from GRDC research investment will be through licensing to suitable partners, investments in joint ventures and companies to deliver the products will be considered based on the merits of business cases that demonstrate that this will deliver the best outcome for the industry.

In selecting investment structures, the GRDC follows its internal guidelines and identifies and implements the most appropriate structure for holding its equity in each business arrangement. The GRDC position is that all commercial entities with which it is involved should have appropriate boards that possess the broad range of skills required to provide oversight for the business.

The GRDC continues to seek new business opportunities that arise from its research portfolio, with the aim of providing benefit firstly to growers and secondly to the GRDC and its research partners. For each commercial business opportunity, the GRDC seeks investment of resources from the 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.

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 2009–10 is described below.

New crop varieties

In 2009–10, the GRDC was actively involved in the release and commercialisation of several new crop varieties. The GRDC's primary objective was to encourage rapid adoption of the new, superior varieties by growers, while protecting the interests of the intellectual property owners.

In selecting commercial partners, the GRDC and its research partners take 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 addition to participating directly in the commercialisation of new wheat varieties where it has co-ownership of the cultivars, the GRDC monitors the total number of new wheat varieties released, including private breeding company releases. The GRDC reports on the total releases so that breeding activity, regardless of whether it is publicly funded or a private enterprise, can be monitored over time.

The new crop varieties commercialised in 2009–10 included:[2]

- four new wheat varieties—Katana(Þ), King Rock(Þ), Preston(Þ) and Revenue(Þ)
- three new oat varieties—Yallara(Þ), Tungoo(Þ) and Mulgara(Þ)
- one new desi chickpea variety—PBA Slasher(Þ)
- two new lentil varieties—PBA Bounty(Þ) and PBA Flash(Þ)
- one new broad bean variety—PBA Kareema(Þ).

New grain products

During 2009–10, negotiations to bring high-amylose wheat to market in Australia, North America, Europe and selected markets in North Asia continued, through Arista Cereal Technologies Pty Ltd. Arista is a joint venture company established by the GRDC, CSIRO and Limagrain Cereal Ingredients to develop and commercialise high-amylose wheat as a new healthy grain product.

The GRDC is also working with CSIRO to commercialise a novel grain yield technology. Negotiations commenced in 2009–10 and will conclude in late 2010.

New farm products and services

In the 2010 sowing season, Novozymes Biologicals Australia Pty Ltd (a GRDC joint venture) released for sale a new growth-enhancing phosphorous solubilisation product, marketed as JumpStart®, for use on cereals and canola. The product contains a strain of the fungus *Penicillium bilaii* discovered by CSIRO and patented through the GRDC. The product has also been licensed to the GRDC's Canadian joint venture partner Novozymes Biologicals Ltd for commercialisation outside Australia.

Also in 2009–10, a number of new technologies were subject to assessment in preparation for commercialisation, including:

- the Harrington Weed Seed Destructor, a machine that is towed behind a harvester and destroys weed seeds from the chaff stream
- GLO2, a grain fumigant
- two biological controls for insect pests, one for snails and another for grain pests such as thrips and mirids
- a test for detecting plant-available phosphorus in the soil.

GRDC Southern Panel member Merna Curnow in a healthy canola crop on Ted Langley's property located at Pine Hill, SA. *Photo: GRDC*

During 2010–11, the GRDC and its research partners will be running expression of interest processes to seek commercial partners for these technologies.

Business relationships

Most of the GRDC's business relationships are governed by contracts, such as research agreements and the licensing of the resulting intellectual property. However, in several cases the most effective way to encourage adoption of innovation in the grains industry is to establish a company or unincorporated joint venture. Key reasons for deciding to set up 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 cooperative research centres, government policy.

Table 20 describes the companies in which the GRDC had shares or membership at 30 June 2010. In most cases the GRDC also nominated one or more directors to the company's board.

2 The term 'new varieties commercialised' is defined by the GRDC as meaning 'varieties for which there is a significant amount of seed available commercially to growers'.

TABLE 20:

Companies in which the GRDC had shares or membership as at 30 June 2010

Name	Activity	GRDC role
Companies limited by guarantee		
Agrifood Awareness Ltd	Provides information about gene technology to enable informed debate	Is a member of the company and provides research funding Nominates a director
Australian Crop Accreditation System Limited	Provides cereal variety details online for farmers and advisers, manages the National Variety Trials	Is a member of the company and provides a research contract Nominates a director
Australian Seed Federation Limited	Promotes interests of seed industry members	Is a member of the company
CRC National Plant Biosecurity Ltd	Serves as the management company for the Cooperative Research Centre (CRC) for National Plant Biosecurity	Is a member of the company and provides a research contract
Grain Foods CRC Ltd	Develops innovative grain products	Is a member of the company and provides a research contract Nominates a director
Go Grains Health & Nutrition Limited	Identifies and communicates the health benefits of grain food products	Is a member of the company and provides research funding Nominates a director
Pulse Australia Ltd	Provides leadership for the development of the pulse industry in Australia	Is a member of the company Nominates a director
Single Vision Grains Australia Limited	Inactive	Is the only member Appoints the directors
Value Added Wheat CRC Ltd	Serves as the management company for the Value Added Wheat CRC	Is a member of the company Nominates a director
Companies limited by shares		
Arista Cereal Technologies Pty Ltd	Undertakes development of high-amylose wheat	Is a 19% shareholder Nominates one director
Australian Centre for Plant Functional Genomics Pty Ltd	Conducts functional genomics research into abiotic stress	Is a 19% 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 39% shareholder and provides research contracts Nominates three of the seven directors
Australian Weed Management Pty Ltd	Served as the management company for the CRC for Australian Weed Management, now manages commercialisation of CRC intellectual property	Has a beneficial interest in one share of the company
Canola Breeders Western Australia Pty Ltd	Develops high-performing commercial canola varieties focused on Western Australian low-rainfall areas with some adaptation to other regions of Australia	Is a 31% shareholder Nominates one director
HRZ Wheats Pty Ltd	Develops high-yielding milling wheat varieties for Australia's high-rainfall zone	Is a 40% shareholder Nominates one director

TABLE 20:
Companies in which the GRDC had shares or membership as at 30 June 2010 *(continued)*

Name	Activity	GRDC role
Companies limited by shares *(continued)*		
InterGrain Pty Ltd	Undertakes commercial wheat breeding	Is a 35% shareholder Nominates one director
Novozymes Biologicals Australia Pty Ltd (formerly Philom Bios (Australia) Pty Ltd)	Develops and markets inoculant products to benefit growers	Is a 50% shareholder and provides research contracts Nominates two of the four directors

Intellectual property management

The GRDC 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.

Lentils sown into heavy wheat stubbles following two years of use of chicken manure and reduced seeding phosphorus.
Photo: Emma Leonard

The GRDC (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.

In early 2010 the GRDC purchased new intellectual property management software, to better manage its patent and plant breeder's rights (PBR) holdings. Patent data is being loaded into the database in mid-2010, and PBR data is expected to be loaded in the second half of 2010.

Patents

During 2009–10, the GRDC continued to file and prosecute a number of patent applications and to maintain a number of patents. All patent families of applications except one are held in conjunction with research partners.

The distribution of the patents among the GRDC's three lines of business is:

1 Practices—three patent families

2 Varieties
  - Gene Discovery—seven patent families
  - Germplasm Enhancement—seven patent families
  - Pulse and Oilseed Breeding—three patent families

3 New Products
  - New Farm Products and Services—15 patent families
  - New Grain Products—17 patent families.

Plant breeder's rights

In 2009–10, the GRDC and its research partners:

- lodged ten new PBR applications
- withdrew no new PBR applications
- surrendered eight certificates of PBR.

At 30 June 2010, the GRDC co-owned 139 plant varieties covered by PBR and 31 PBR applications.

Trademarks

At 30 June 2010, the GRDC held 11 trademarks, either in its own right or jointly.

PART 3

Our Organisation

Bruce Crosby in a summer maize crop. *Photo: Melanie Jenson, CRDC*

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.

Board members

As illustrated in Figure 13, 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 public administration.

FIGURE 13:
Members of the GRDC Board in 2009–10

Directors as at 30 June 2010

Keith Perrett

Chair (Non-executive)

Appointed:
1 October 2007 until
30 September 2010

Member:
Remuneration Committee

Keith farms his 1,000 hectare Gunnedah property in northern New South Wales. He produces wheat, barley, cotton, sunflower, sorghum, sheep and cattle.

He is the Chairman of the National Rural Advisory Council, which advises the Minister for Agriculture, Fisheries and Forestry on rural issues, including Exceptional Circumstances declarations.

Keith was President of the Grains Council of Australia between April 2001 and April 2005. He is a past Chairman of the New South Wales Farmers' Association Grains Section, and has represented the grains industry at state and federal levels.

Keith was the Chairman of the Wheat Research Foundation of New South Wales between 2000 and 2007. He was also a member of the Governing Council of the Plant Breeding Institute of the University of Sydney between 1997 and 2003 and Chairman from 2000 to 2007.

Peter Reading

BScAg (Hons), FAICD

Managing Director (Executive)

Appointed:
February 2004

Peter has been Managing Director of the GRDC in Canberra since February 2004.

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; British Oxygen Group in Australia and Asia; and the Grain Pool in Western Australia.

FIGURE 13:
Members of the GRDC Board in 2009–10 *(continued)*

Directors as at 30 June 2010

Nicole Birrell
M.Sc (LSE), FAICD

Director (Non-executive)

Appointed:
1 October 2005, reappointed until 30 September 2011

Chair:
Finance, Risk and Audit Committee

Nicole is an operational risk management consultant and runs a mixed farming enterprise at Corowa, New South Wales. She has more than 25 years experience in corporate and investment banking, most recently as Head of Operational Risk and Compliance for the ANZ's Institutional Financial Services division.

Nicole is currently a director of Queensland Sugar Ltd, Superpartners Pty Ltd and SMS Management and Technology Ltd, and a member of Wheat Exports Australia.

She is a member of the audit and risk management committees in each of these organisations.

Nicole also serves on the Programs Advisory Committee for the School of Applied Economics at Victoria University, Melbourne. She is a past director of AusBulk Ltd and Australian Practice Nurses Association Inc.

Colin Butcher
MBA (Curtin University), GAICD

Director (Non-executive)

Appointed:
11 November 2008 until 30 September 2011

Member:
Finance, Risk and Audit Committee

Colin is a grain producer from Brookton in Western Australia. His farming business produces wheat, canola, barley and hay for export, and sheep for meat and wool.

Colin is also a board member of ChemCert Western Australia and is a previous director of both CBH Ltd and the Grain Pool Pty Ltd. He has extensive experience in the grains industry and has represented the interests of grain producers at state and national levels.

Colin has a strong interest in the management and conservation of natural resources.

Jenny Goddard
BComm (Hons in Economics)

Director (Non-executive)

Appointed:
11 November 2008 until 30 September 2011

Member:
Finance, Risk and Audit Committee

Jenny works as a director and an economic and public policy consultant. She has 23 years of experience as an economic policy adviser to the Australian Government, initially in the Department of the Treasury and later in the Department of the Prime Minister and Cabinet, where she worked until May 2008.

Her 11 years as a senior executive officer in the Department of the Prime Minister and Cabinet include four years as a deputy secretary with policy responsibility for the economic, industry, infrastructure and environment, and Cabinet divisions; and the Council of Australian Governments Secretariat.

Jenny is the inaugural Chair of the Australian Solar Institute Board. She is also a Commissioner with the Australian Fisheries Management Authority.

Jenny has extensive experience in and understanding of government policies, processes and administration, including detailed knowledge of Australian Government Cabinet and Budget processes.

FIGURE 13:

Members of the GRDC Board in 2009–10 *(continued)*

Directors as at 30 June 2010

Steve Marshall

BSc(Hons1), M.AppSc, FAIFST

Director (Non-executive)

Appointed:
1 October 2005, reappointed until 30 September 2011

Appointed as Deputy Chair:
24 February 2009 until 30 September 2011

Member: Remuneration Committee
Finance, Risk and Audit 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.

Steve became a director of Go Grains Health & Nutrition Limited in 2008.

He was a director of the Rural Industries Research and Development Corporation from June 2002 and Deputy Chair until May 2008. He was also a Director of the Australian Rural Leadership Foundation from 2005 to 2007.

Professor Timothy Reeves

B.Sc(Hons), M.Agr.Sc, FTSE

Director (Non-executive)

Appointed:
1 October 2005, reappointed until 30 September 2011

Member: Remuneration Committee

Timothy is a consultant specialising in national and international agricultural R&D. He has worked for 40 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 to 1995); and Director General of the International Maize and Wheat Improvement Center (CIMMYT) (1995 to 2002).

His other roles have included: Member, United Nations Millennium Project Task Force on Hunger; Senior Expert, Food and Agriculture Organization of the United Nations; Member, European Commission Expert Group for Evaluation of Framework Projects; Chair, Academic Advisory Board on International Community and Development Studies, Deakin University; Professorial Fellow, Melbourne University; Adjunct Professor, Queensland University of Technology; and Adjunct Professor, Deakin University. He is a former President of the Australian Society of Agronomy. Timothy has received several international and national honours, including the Centenary Medal for service to Australian society.

Professor Graeme Robertson

BSc (Ag) (Hons), PhD in plant physiology (Oxford), FAIM, FAIAST, FTSE

Director (Non-executive)

Appointed:
11 November 2008 until 30 September 2011

Graeme is a consultant and a part-time academic, and serves as a Commissioner of the Agricultural Produce Commission in Western Australia. He was the Director of Curtin University's School of Agriculture and Environment (the Muresk Institute) from 2004 to 2009, responsible for agribusiness, horticulture, viticulture, environmental biology, rangeland science and aquaculture programs.

Graeme's career has included ten years as Director General of the Western Australian Department of Agriculture. He was the inaugural Chair of the Land and Water Resources Research and Development Corporation and served on a number of state and national boards and committees related to agriculture and land resource management.

Graeme was awarded a Rhodes Scholarship in 1970; the Sir William McKell Medal for outstanding contribution to soil and land conservation in 1993; the Australian Medal of Agricultural Science in 2001; and a Centenary Medal for service to Australian society in 2002.

Board selection

The Minister selects and appoints the Chair of the Board. The Managing Director is selected by the Board, and holds office at the corporation's pleasure.

The Selection Committee, a committee chosen by the Minister for Agriculture, Fisheries and Forestry on advice from the Grains Council of Australia, nominates between five and seven GRDC directors. Appointment of directors nominated through this mechanism is subject to ministerial approval.

GRDC directors are appointed for approximately three-year terms. No Board appointments were made during 2009–10.

Board as at 30 June 2010. (Left-right—Back row) Colin Butcher, Graeme Robertson, Peter Reading, Timothy Reeves, Steve Marshall (Left-right—Front row) Nicole Birrell, Keith Perrett, Jenny Goddard. *Photo: Geoff Comfort*

Board Secretary

Geoff Budd, GRDC Executive Manager Legal & Procurement, is the 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 timeframes
- prepare Board agendas
- collate and distribute Board papers and other related documents.

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 21.

Meetings

The GRDC Board holds six to seven meetings every 12 months, teleconferences as required, and tours to GRDC regions. During 2009–10 the Board held five meetings in Canberra; one meeting in Melbourne; and visits to southern Queensland (Toowoomba–Dalby region) in August 2009 and southern Western Australia (Esperance) in October 2009.

The Board also held three teleconferences in 2009–10. All directors took part in each teleconference.

Each director's attendance at Board and Board committee meetings during the year is set out in Table 22.

TABLE 21:
Board committees as at 30 June 2010

Committee	Role	Membership
Finance, Risk and Audit Committee	Assist the Board in fulfilling its corporate governance responsibilities. 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. Review the corporation's financial statements.	At least three non-executive directors.
Remuneration Committee	Review and make recommendations to the Board on matters relating to the remuneration and performance of the Managing Director. Review advice from the Managing Director on remuneration and performance policy for the corporation.	The Chair, the Deputy Chair and one other director.

TABLE 22:
Attendance at Board and committee meetings, 2009–10

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
Nicole Birrell	6	6	4	4		
Colin Butcher	6	6	4	4		
Jenny Goddard	6	6	4	4		
Steve Marshall	6	6	4	4	2	2
Keith Perrett	6	6			2	2
Peter Reading	6	6				
Timothy Reeves	5	6			2	2
Graeme Robertson	6	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. The Board reviews its roles and responsibilities in July each year. To request a copy of the manual, telephone the GRDC on 02 6166 4500 or send an email to grdc@grdc.com.au.

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 interests

Directors must comply with the *Commonwealth Authorities and Companies Act 1997* (CAC Act) requirements regarding material personal interests and with the GRDC's policy and procedures for conflict of interest. The Board reviews declarations of conflicts of interest at the start of each Board meeting and directors regularly update their conflict of interest declarations.

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.

Relationship with the Executive Management Team

The Executive Management Team 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.

Performance monitoring and review

At the start of each year the Board sets a detailed work plan for the corporation. The Board reviews the corporation's performance against the work plan at least three times each year. This is a key factor in determining the level of any performance bonuses paid to GRDC staff.

At the start of each year the Board also sets its own annual key performance objectives. The Board reviews its performance against these objectives at least three times per year. At each meeting the Board uses a checklist to review its performance against agreed effectiveness indicators.

The Board periodically commissions an external review of its performance. In 2009 the Board engaged Blake Dawson to conduct a detailed review of the Board's performance, including by testing the Board's performance against the findings and recommendations of the reviews conducted by Blake Dawson in 2004–05, 2006–07 and 2007–08 (the earlier reviews are described in the annual reports for those years).

Blake Dawson provided its latest report in April 2010. It concluded that 'The 2009–10 review highlighted that the GRDC continues to attain a high standard of governance. In particular the Board has continued to improve and implement a number of governance reform measures.' The Board and management are implementing the recommendations of the review.

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 management structure is shown in Figure 7 in Part 1.

The EMT leads the GRDC's business activities, advises the GRDC Board and implements the Board's decisions. 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.

Information on the roles and backgrounds of the EMT members is shown in Figure 14.

FIGURE 14:
Members of the GRDC Executive Management Team during 2009–10

Peter Reading
Managing Director

Peter has been Managing Director of the GRDC in Canberra since February 2004.

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; British Oxygen Group in Australia and Asia; and the Grain Pool in Western Australia.

Stephen Thomas
Executive Manager, Practices
Executive Manager, Communication & Capacity Building[a]

Stephen joined the GRDC in March 2009 and manages all aspects, including performance, of the GRDC's R&D investments in the 'better practices developed and adopted faster' pathway.

Stephen is a graduate member of the Australian Institute of Company Directors. He was previously a director of the Value Added Wheat Cooperative Research Centre (VAWCRC) and has held board positions with Enterprise Grains Australia and the Australian Sheep Industry CRC.

Stephen was Director of Rural Innovation at the New South Wales Department of Primary Industries and a member of the New South Wales Expert Committee on Gene Technology.

Stephen has an honours degree in Agricultural Science and a PhD in molecular biology from Adelaide University. He has undertaken postdoctoral research in Australia and overseas.

John Harvey
Executive Manager, Varieties
Executive Manager, Communication & Capacity Building[a]

John manages all aspects, including performance, of the GRDC's R&D investments in the 'better varieties, faster' pathway. He is also responsible for the GRDC's strategies for, and investments in, capacity building.

John is a graduate member of the Australian Institute of Company Directors. He is a director of Australian Crop Accreditation System Limited and was a director of the VAWCRC. He is on the management boards of Pulse Breeding Australia, Barley Breeding Australia and the National Soybean Breeding Program. He is also a member of the Australian Winter Cereals Pre-Breeding Alliance.

John joined the GRDC in November 1997 as Program Manager Farming Systems. He became Manager R&D Programs in 2001 and Executive Manager Varieties in 2005. His background is in agricultural extension and research, development and extension (RD&E) management. He previously worked with the Queensland Department of Primary Industries.

a Responsibility for the Communication & Capacity Building output group is shared by John Harvey, Stephen Thomas and the Communications Manager, Kylie Paulsen.

FIGURE 14:

Members of the GRDC Executive Management Team during 2009–10 *(continued)*

Vince Logan

Executive Manager, New Products

Vince manages all aspects, including performance, of the GRDC's R&D investment in the 'new products' pathway.

He is a director of Novozymes Biologicals Australia Pty Ltd and Arista Cereal Technologies Pty Ltd. He has been a board member of Pulse Australia Limited, GrainGene, the VAWCRC and Australian Grain Technologies Pty Ltd.

Vince joined the GRDC in 1996 as Business Manager after 17 years in finance and marketing roles in the petroleum industry. He was appointed Executive Manager Business Development in 2001 and Executive Manager New Products in 2004.

Vince is a Certified Public Accountant and a graduate member of the Australian Institute of Company Directors.

Leecia Angus

Executive Manager, Corporate Strategy & Impact Assessment

Leecia manages the development of the corporate strategy, regional panel and program support, and impact assessment of RD&E investments.

Leecia joined the GRDC in 2005 as Manager Wheat and Barley Breeding. She was appointed Executive Manager Corporate Strategy & Impact Assessment in May 2009.

Leecia holds an honours degree in science and a Graduate Diploma in Applied Finance and Investment. She is a graduate of the Australian Institute of Company Directors and the Australian Rural Leadership Program.

Geoff Budd

Executive Manager, Legal & Procurement

Geoff manages the GRDC's legal, procurement, risk management and compliance areas. He is also the GRDC Board Secretary, providing administrative support to the Board.

Geoff represents the GRDC as a director of Pulse Australia Limited and a director of Single Vision Grains Australia Limited.

Geoff joined the GRDC in January 2001 as Corporate Lawyer, from private practice as a commercial lawyer employed by a national law firm. He was appointed General Counsel and Board Secretary in 2004 and Executive Manager Legal & Procurement in 2009. He holds a current legal practising certificate and membership of the Australian Capital Territory Law Society.

Geoff has a Master of Laws specialising in intellectual property. He is a graduate of the Australian Rural Leadership Program and a Fellow of the Australian Institute of Company Directors.

Gavin Whiteley

Executive Manager, Corporate Services

Gavin manages the GRDC's corporate support activities, ensuring their integration, where appropriate, and their value-added contribution to the GRDC's business planning and operations.

Gavin is a Director of Single Vision Grains Australia Limited and Agrifood Awareness Australia Limited.

Gavin joined the GRDC in January 2005. He has a strong background in agribusiness, having previously held executive level roles in the beef, cotton and chicken-meat industries. Prior to joining the GRDC, Gavin was Regional General Manager—Riverina with Bartter Enterprises, based at Griffith, New South Wales.

Gavin and his family own grain and livestock properties in central-west New South Wales.

He holds an honours degree in agricultural economics and an associate diploma in farm management. He is a member of CPA Australia, a Fellow of the Australian Institute of Company Directors and a graduate of the Australian Rural Leadership Program.

Staff

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.

The Minister for Agriculture, Fisheries and Forestry has directed the GRDC to adopt the Australian Government Bargaining Framework. The corporation is in the process of complying with this direction.

As at 30 June 2010, there were 50 full-time employees, including the Managing Director. The gender mix consisted of 23 females and 27 males. A staff list is provided in Table 23.

TABLE 23:
Staff as at 30 June 2010

	Position	Occupant
Managing Director's area	Managing Director	Peter Reading
	Executive Assistant	Wynette Neil
	Manager Communications	Kylie Paulsen
	Communications Coordinator	Gabrielle Bush
Corporate Services	Executive Manager	Gavin Whiteley
	Manager Finance	Danielle Jakubowski
	Accountant—Reporting	Nino Divito
	Contract Payments Officer	Carmen Jiang
	Accounts Payable Officer	Johan Pienaar (T)
	Manager Human Resources	Wendy Neil
	Records Management Coordinator	Ross Thompson
	Travel Coordinator	Sarah Smith
	Receptionist	Katie Wineland (T)
	Administrative Assistant	Helen Moffat (T)
	Manager IT Facilities	Tavis Hamer
	Network Administrator	Bob Watson
	Network Support Officer	Brendan Lawler
Legal & Procurement	Executive Manager	Geoff Budd
	Corporate Lawyer	James Macintyre
	Compliance Officer	Catherine Wells
	Manager Procurement and Contracting	Cathy Stewart
	Contracts Coordinator	Klaudia Skazlic
Corporate Strategy & Impact Assessment	Executive Manager	Leecia Angus
	Impact and Business Analyst	Vincent Fernandes
	Corporate Strategist Evaluation and Reporting	Zoltan Lukacs
	Panel Support Officer (National)/Internal Business Processes	Noelia Grech
	Panel Support Officer (South)/Panel Engagement Processes	Carolyn Pearson
	Panel Support Officer (West)/Portfolio Balance	Toby Delaney
	Panel Support Officer (North)/Administrative support	Ben Maroney
Practices	Executive Manager	Stephen Thomas
	Administrative Coordinator	Peta McKinnon
	Manager Crop Protection	Rohan Rainbow
	Manager Agronomy Soils and Environment	Martin Blumenthal
	Administrative Coordinator	Penelope Vaile (T)
	Project Manager Climate Change	Sara Hely

TABLE 23:
Staff as at 30 June 2010 *(continued)*

	Position	Occupant
Practices *(continued)*	Manager Validation and Adoption	Stuart Kearns
	Manager Extension and Grower Programs	Tom McCue
	Webmaster	Sam Livingstone
	Manager Publications	Maureen Cribb
	Project Manager Practices	Tanya Robinson
	Project Manager Practices	Zoe Morosini
Varieties	Executive Manager	John Harvey
	Coordinator Varieties and Capacity Building	Merrilyn Baulman
	Manager Gene Discovery	Juan Juttner
	Manager Germplasm Enhancement	Jorge Mayer
	Administrative Coordinator	Wendy Bosci
	Project Manager Plant Breeding	Alok Kumar
	Project Manager Pre-Breeding	Omid Ansari
	Manager Wheat and Barley Breeding	Andreas Betzner
	Manager Pulse/Oilseed Breeding	Brondwen MacLean
	Administrative Coordinator	Nicole Carney
New Products	Executive Manager	Vince Logan
	Administrative Coordinator	Bettina Garrett
	Manager New Farm Products and Services	Paul Meibusch
	Manager New Grain Products	Jody Higgins

(T) = temporary staff

GRDC staff during a team-building exercise in December 2009. *Photo: GRDC*

Staff location

All GRDC management groups, including the professional staff who manage research contracts and investment opportunities, are housed in offices at the following Canberra address:

Grains Research and Development Corporation
First Floor
40 Blackall Street
BARTON ACT 2600

The GRDC owns one floor of Tourism House at 40 Blackall Street. The GRDC does not own any research facilities.

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 three program teams. This network helps to ensure that GRDC investments are directed towards the interests of all its stakeholders and the strategic objectives of its programs.

National Panel

The National Panel comprises the three regional panel chairs, the GRDC's Managing Director and the GRDC's executive managers. The National Panel addresses national R&D priorities across the GRDC's investment portfolio and advances recommendations 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 and investment strategy; and endorsing review recommendations. The National Panel also plays a major role in communicating with research partners and stakeholders.

Regional panels

The three regional panels are composed of grain growers, agribusiness representatives, researchers and the GRDC's executive managers, with provision for other industry experts to participate as appropriate. Regional panel members also participate as members of 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 from the point of view of regional needs, gaps in the R&D portfolio, quality of the proposal and risk. The panels are responsible for ensuring that investment strategy is responding to the regional and national priorities of stakeholders.

The GRDC Operating Manual covers the roles, responsibilities, codes of conduct, remuneration and selection guidelines for panel members. Panel members as at 30 June 2010 are listed in Table 24. Biographical information on panel members is available from the GRDC website.

TABLE 24:
Regional panel membership as at 30 June 2010

	Chair/Deputy Chair	Members	
Northern Regional Panel	James Clark John Sheppard	David Freebairn Richard Heath Penny Heuston Vince Logan Jodi McLean	Aaron Sanderson Rob Taylor Gavin Whiteley Bill Yates
Southern Regional Panel	David Shannon Mark Peoples	Andrew Barr Chris Blanchard Geoff Budd John Crosbie[a] Merna Curnow	Richard Konzag Allan Mayfield Andrew Rice Peter Schwarz Stephen Thomas
Western Regional Panel	Neil Young Richard Oliver	Leecia Angus Ralph Burnett Anna Butcher Merrie Carlshausen David Fienberg[b]	Tracey Gianatti John Harvey Frances Hoyle Peter Roberts

a Resigned June 2010.
b Resigned March 2010.

Nicole Birrell, GRDC Board member; Mark Hansen, Burdekin farm manager; Aaron Sanderson, northern panel member.
Photo: Rachel Bowman, Cox Inall

Program teams

Each of the GRDC's three 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, some program teams comprise several subprograms (as shown in Table 25).

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

TABLE 25:
Program teams as at 30 June 2010

Program team	Subprogram teams
Practices	• Agronomy, soils and environment • Crop protection • Validation and integration • Extension and grower programs
Varieties	• Pre-breeding • Breeding
New Products	• New grain products • New farm products and services

Western panel members: (from left) Richard Oliver, Ralph Burnett, Leecia Angus, Anna Butcher, Narelle Moore, Fran Hoyle, Merrie Carlshausen and Neil Young. *Photo: Cox Inall*

The GRDC is accountable to its two key customer groups—Australian grain growers and the Australian Government—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 accountable to the Australian Parliament through the Minister for Agriculture, Fisheries and Forestry, who is responsible for all rural R&D corporations, including the GRDC. During 2009–10 the Hon. Tony Burke, MP, was the Minister for Agriculture, Fisheries and Forestry.

Australian Government priorities

The GRDC's strategies and investments actively address the Australian Government's National Research Priorities and ministerial research priorities for rural R&D. These priorities and the GRDC's achievements in meeting them during 2009–10 are discussed in detail in Part 2.

Ministerial directions

The PIERD Act and the CAC Act provide that the responsible minister or the Finance Minister may direct the GRDC with respect to the performance of its functions and the exercise of its powers, or require it to provide information.

In July 1998, the responsible minister, the Minister for Primary Industries and Energy, issued a direction 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 1 December 2004, the Finance Minister issued the Finance Minister's (CAC Act Procurement) Directions 2004, requiring the GRDC to comply with the *Commonwealth Procurement Guidelines*.

On 18 December 2006, the Finance Minister required the GRDC to provide an annual report on compliance and financial sustainability, under section 16(1)(c) of the CAC Act. The requirements are detailed in Finance Circular 2008/05 Compliance Reporting–CAC Act bodies.

The GRDC is complying with the directions.

On 23 September 2008, the responsible minister, the Minister for Agriculture, Fisheries and Forestry, directed the GRDC to adopt the Australian Government Bargaining Framework. The GRDC is in the process of achieving compliance with this direction.

General policies of the government

Until 1 July 2008, under section 28 of the CAC Act, the responsible minister could notify the GRDC Board of any general Australian Government policies that apply to the GRDC.

The GRDC had been notified of the following policies as at 30 June 2008:

- Commonwealth Fraud Control Guidelines 2002
- Finance Circular No. 2006/06 Australian Government Foreign Exchange Risk Management Guidelines (replacing Finance Circular 2002/01 and Finance Circular 2004/11)
- Finance Circular No. 2005/09 Australian Government Cost Recovery Guidelines (replacing Finance Circular 2002/02)
- National Code of Practice for the Construction Industry and the associated implementation guidelines
- Australian Government Property Ownership Framework 2005
- Protective Security Manual 2005.

The GRDC is complying with the notified policies.

Section 28 of the CAC Act has been amended, and now provides that from 1 July 2008 the GRDC must comply with any General Policy Order made by the Finance Minister, to the extent that it applies to the GRDC. At 30 June 2010, the Finance Minister had not made any General Policy Orders that apply to the GRDC.

Accountability to the grains industry

Industry representative

Under the PIERD Act, the GRDC is made accountable to Australian grain growers through the industry's representative organisation, which in 2009–10 was the Grains Council of Australia (GCA).

In August 2010, Grain Producers Australia became successor to the GCA, maintaining the same Australian Business Number and performing the legislative roles and prescribed functions previously undertaken by the GCA.

Grains industry priorities

In setting directions for 2009–10 (the third year of *Prosperity through Innovation*, the Strategic R&D Plan 2007–12), the GRDC identified industry priorities through direct consultations with the GCA, as well as

local research advisory committees, grower groups, grower organisations and individual grain growers. The key industry priorities were incorporated into the GRDC Annual Operational Plan 2009–10. The priorities and the GRDC's achievements in meeting them during 2009–10 are discussed in detail in Part 2.

Stakeholder report

Each year the GRDC prepares a stakeholder report to assist the GCA to formulate advice to the Minister on setting the research levy rates which provide the basis for the corporation's income. The draft Stakeholder Report 2010–11 was provided to the GCA in December 2009 for comment. The final Stakeholder Report 2010–11 was provided to the GCA in March 2010.

The GRDC also prepares a Growers' Report. This 20-page report is a shortened form of the GRDC Annual Report, providing a reader-friendly summary of how the GRDC operates, the corporation's financial situation and highlights of research investments. The 2008–09 report was circulated to growers and other *Ground Cover* subscribers in January 2010.

Industry levy rates

In 2009–10, 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 2009–10 are recorded in Note 3C of the Notes to the Financial Statements.

The GRDC paid the Australian Government Department of Agriculture, Fisheries and Forestry $551,316 for the collection and management of levies in 2009–10.

Consultation arrangements

The GRDC paid the GCA $29,516.31 for its participation in consultations with the corporation during 2009–10. 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.

The GRDC did not provide any funding to the GCA for project funds and conference support in 2009–10.

The GRDC met some out-of-pocket costs for three grain growers nominated by the GCA—Andrew Weidemann (Victoria), Ray Marshall (Western Australia) and Wayne Newton (Queensland)—to represent grain growers during development of the National Primary Industries Research, Development and Extension (RD&E) Framework.

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 to 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)
- invest any reserves in accordance with the manners listed in section 18 or approved by the Finance Minister (approved under *Commonwealth Authorities and Companies Act 1997—Investment Approval 2008/01—Grains Research and Development Corporation* and *Commonwealth Authorities and Companies Act 1997—Investment Approval 2008/01—Dematerialised equivalents*)

- comply with any General Policy Orders of the Australian Government to the extent that the General Policy Order applies to it (sections 28 and 48A)
- ensure that the general policies of the Australian Government as notified to the corporation before 1 July 2008 are carried out (Table A Item 71).

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*.

In particular, a director must 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 and does not take part in any decision on the relevant subject matter (section 27F to section 27K). These requirements are reinforced by the GRDC's policy and procedures regarding conflict of interest, as discussed in the 'Board' section of Part 3.

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)
- accounting records (section 20)
- 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 2009–10 is presented on pages 110–111.

Judicial decisions and reviews by outside bodies

In 2009–10, the GRDC was not affected by judicial decisions.

On 15 February 2010 the Productivity Commission commenced a review of the rural R&D corporations (RDCs), including the GRDC, with the following terms of reference:

- examine the economic and policy rationale for Commonwealth Government investment in rural R&D
- examine the appropriate level of, and balance between, public and private investment in rural R&D
- consider the effectiveness of the current RDC model in improving competitiveness and productivity in the agriculture, fisheries and forestry industries through R&D
- examine the appropriateness of current funding levels and arrangements for agricultural R&D, particularly levy arrangements, and Commonwealth matching and other financial contributions to agriculture, fisheries and forestry RDCs
- consider any impediments to the efficient and effective functioning of the RDC model and identify any scope for improvements, including in respect to governance, management and any administrative duplication
- consider the extent to which the agriculture, fisheries and forestry industries differ from other sectors of the economy with regard to R&D; how the current RDC model compares and interacts with other R&D arrangements, including the university sector, cooperative research centres and other providers; and whether there are other models which could address policy objectives more effectively
- examine the extent to which RDCs provide an appropriate balance between projects that provide benefits to specific industries versus broader public interests including examining interactions and potential overlaps across governments and programs, such as mitigating and adapting to climate change; managing the natural resource base; understanding and responding better to markets and consumers; food security, and managing biosecurity threats
- examine whether the current levy arrangements address free rider concerns effectively and whether all industry participants are receiving appropriate benefits from their levy contributions.

The Productivity Commission is due to release its draft report in September 2010, and to provide its final report to the Australian Government by 15 February 2011.

The GRDC has lodged a submission to the review. Information about the review, including all public submissions, is available on the Productivity Commission website, www.pc.gov.au.

The GRDC Board has overall responsibility for corporate governance within the organisation and places high value on continuously improving the GRDC's performance in this area.

Key activities during 2009–10 included:

- commissioning Murray Fedderson of Grow Sustainability Pty Ltd to better integrate the GRDC's quality processes with its policies and procedures—the report will be available in August 2010 and the GRDC will implement its recommendations in 2010–11
- updating policies and procedures on the use of credit cards and travel risk management
- designing and implementing new business risk reports to align with the new risk management standard AS/NZ ISO 3100:2009 Risk Management—Principles and Guidelines
- conducting monthly reviews of business and fraud risks
- testing the Business Continuity Plan and Information Technology Disaster Recovery Plan.

The GRDC won the NAB Grant Thornton Risk Management Award category and was a finalist in the Oppeus Governance Award category at the 2009 NAB Agribusiness Awards for Excellence. This success built on the GRDC's winning the Ernst & Young Risk Management Award category at the 2007 NAB Agribusiness Awards for Excellence.

Geoff Budd, Executive Manager Legal & Procurement, and Gavin Whiteley, Executive Manager Corporate Services, after receiving the NAB Grant Thornton Risk Management Award at the 2009 NAB Agribusiness Awards for Excellence on 29 October 2009. *Photo: NAB*

Policies and procedures

In continuously improving the GRDC's corporate governance, the corporation is guided by the Australian National Audit Office *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 its committees)
- Code of Conduct
- approval authority schedule, which sets delegations from the Board to management under the PIERD Act.

Code of Conduct

The GRDC Code of Conduct is published as part of the GRDC Operating Manual. New directors and staff members are introduced to the code during induction, and presentations on the code are made to staff at regular intervals. All staff have access to the code via the policies section on the GRDC intranet.

Risk management and fraud control

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 regular business environment report to the Board. This report is used to update the GRDC's situation analysis and identify developing risks.

The EMT and Board conduct a detailed review of the GRDC's strategic risks at least every six months.

The GRDC conducts a fraud risk assessment every two years. During 2008–09 the GRDC engaged external provider Oakton to conduct a fraud risk assessment, in conjunction with GRDC management, and to provide an updated GRDC fraud control plan for 2009 to 2011. Oakton provided the final fraud risk assessment and fraud control plan in early 2009–10.

The GRDC also conducts external business risk assessments. Oakton conducted the most recent external business risk assessment in May 2006, and will conduct the next external business risk assessment in early 2010–11.

To ensure that the business and fraud risks identified in the Business Risk Assessment and Fraud Control Plan are fully monitored and regularly updated,

the GRDC's Legal & Procurement team prepares a business risk assessment report and a fraud control action plan. The EMT, in consultation with managers, updates the report and action plan each month. The Board reviews these documents at each meeting, as does the Finance, Risk and Audit Committee.

The EMT also conducts a full review of the business risk assessment report and the fraud control action plan every six months. The business risk report template was updated and risks were rerated in early 2010 to implement new risk management standard AS/NZS ISO 3100:2009 Risk Management—Principles and Guidelines.

The GRDC's Managing Director is satisfied that:

- a fraud risk assessment and fraud control plan have been prepared that comply with the *Commonwealth Fraud Control Guidelines*
- appropriate fraud prevention, detection, investigation and reporting procedures and processes are in place
- annual fraud data has been collected and reported that complies with the *Commonwealth Fraud Control Guidelines*.

The GRDC is insured by Comcover, the Australian Government's self-managed fund for insurance risks. Each year the GRDC participates in Comcover's Risk Management Benchmarking Program. The March 2010 benchmarking survey rated the GRDC at 7.2 out of 10—the 'peer group' of 22 small agencies' average was 6.12 out of 10—and the GRDC topped several elements in the peer group. The GRDC rated:

- relatively high on accounting and responsibility, integration and positive risk culture
- relatively low on business continuity and disaster recovery (largely because the GRDC's Business Continuity Plan had not been tested at the time of the survey—it has been tested since).

Quality assurance

The GRDC's Quality Management System has ISO9001:2008 quality assurance accreditation from BSI Management Systems.

In 2009–10, regular internal audits were conducted by a contracted certified auditor over two days every two months. In December 2009 a successful external surveillance audit was conducted by BSI Management Systems and the GRDC was certified to the ISO9001:2008 standard.

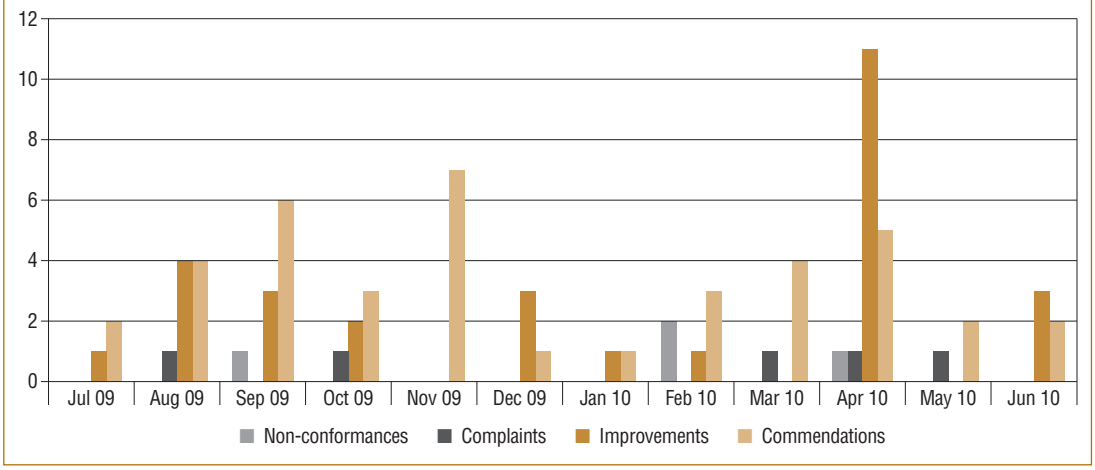
In addition, the EMT formally reviewed the quality system every six months. All aspects of the quality system were considered at the quality management review meetings, including required improvements, complaints, non-conformances and commendations.

Figure 15 shows the results of the quality audits in 2009–10. The audits demonstrate that the Quality Management System based on ISO9001:2008 is robust, is being used correctly and continues to be 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, through Comcover. The Comcover insurance contract prohibits the GRDC from disclosing the nature or limit of the liabilities covered or the amount of premiums payable.

FIGURE 15:
Results of quality audits, 2009–10



Environmental objectives

The GRDC is required to report annually on its performance in relation to ecologically sustainable development and other environmental issues 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 GRDC's environmental policy states:

> The GRDC is committed to investing in RD&E that addresses the environmental priorities of its stakeholders and underpins the sustainable development of an internationally competitive Australian grains industry.

The policy is reflected in the GRDC Strategic R&D Plan 2007–12, *Prosperity through Innovation*, and the Environmental Plan, *A Responsible Lead: An Environmental Plan for the Australian Grains Industry*. The Environmental Plan complements the Strategic R&D Plan 2007–12, adding more detail regarding environmental priorities, and is consistent with the GCA's environmental policy.

The GRDC seeks investments that address the environmental concerns represented in the Australian Government's National Research Priorities and Rural R&D Priorities (as shown in Table 12 in Part 2).

A key element in the implementation of the Environmental Plan is partnerships with regional natural resource management bodies, which have a responsibility for achieving a range of resource targets in Australia. Key issues for the industry are adaptation to climate change, management of greenhouse gas emissions, and management of soil erosion, soil acidification, nutrient loss and salinity. The implications for grain production include the identification of traits, breeding of cultivars and development of practices that allow for improved environmental outcomes.

The GRDC's commitment to addressing these issues is demonstrated in the identification of new RD&E investments in:

- new tolerance traits for saline and sodic soils
- improved nitrogen use efficiency in wheat and barley
- national phenotyping facilities for water productivity traits
- adaptation to climate change and mitigation of greenhouse gas emissions in the Australian grains industry
- water use efficient farming systems
- low-methane producing feed grains.

Other investments also address issues that have environmental outcomes, such as weed management, pesticide use, integrated pest management, tillage practices and crop rotations. The Grain and Graze program being conducted by the GRDC, in partnership with the Australian Government's Caring for our Country initiative, universities, state departments and grower groups, is just one example. Part 2 of this annual report includes more discussion on how GRDC investments helped to achieve environmental objectives.

At the operational level, the environmental policy relating to the GRDC's corporate office commits the GRDC to managing its RD&E activities with minimal impact on the environment, consistent with relevant legislation.

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 2010 has been lodged with the Privacy Commissioner. The online digest may be viewed at the commissioner's website, www.privacy.gov.au.

(From left): Peter Mailer, Grain Producers Australia spokesperson; Keith Perrett, GRDC Chairman, Andrew Weidemann, Victorian Farmers Federation Deputy Vice-President; and Peter Reading, GRDC Managing Director. *Photo: GRDC*

Freedom of information

As an Australian Government statutory authority the GRDC is required to report on the following matters under sections 8 and 9 of the *Freedom of Information Act 1982* (FOI Act):

- details of the organisation, including its functions and decision-making powers
- any arrangements that the GRDC has for outside participation in its policy formulation or decision making
- the types of documents the GRDC holds
- the GRDC's freedom of information procedures, facilities and contact details
- documents and processes that the GRDC uses to make decisions in relation to the funding of R&D projects (the section 9 statement).

Details of the organisation

Details of the organisation of the GRDC, particularly its structure, functions and statutory responsibilities, are provided in Part 1 and Part 3 of this annual report.

External participation

The GRDC consults extensively with grain growers, industry representatives and advisors and researchers to tailor its investment portfolio. These consultation processes are described in many parts of this annual report, particularly the 'Research priorities', 'Collaboration' and output group sections of Part 2, and the 'Advisory panels and program teams' and 'Accountability' sections of Part 3.

Documents

The following is a list of documents held or published by the GRDC:

- corporate documents—such as the annual report, strategic R&D plan, annual operational plan, research reports and newsletters—which are supplied free to the public on request while stocks are available and/or are displayed on the GRDC's website
- industry-specific publications, which are supplied free to the public on request while stocks are available, displayed on the GRDC's website and/or sold to the public on a partial cost-recovery basis
- applying and reporting documents—such as the investment plan; current tenders and expressions of interest; documents related to travel, training and industry development awards and conference sponsorships; and research progress reports—which are available on the GRDC's website
- general administrative documents, including project and personnel files.

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

Procedures and contact details

Applicants may discuss the nature and scope of an intended request under the FOI Act or seek advice on freedom of information matters. Whenever possible, the freedom of information officer will help applicants to identify relevant documents.

If a request is approved, the applicant will be provided with either a copy of the documents or the opportunity to inspect them at the GRDC's office.

Any refusal to grant access will be supported by a statement of reasons, together with a statement advising the applicant of their rights to request that the decision be reviewed.

Any enquiries about 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 6166 4500
Facsimile: 02 6166 4599

Section 9 statement

The GRDC submits an annual statement to the National Archives of Australia as required under section 9 of the FOI Act. The statement outlines the documents and processes the GRDC uses to make decisions in relation to the funding of R&D projects. A copy of the statement can be viewed on the National Archives of Australia website, www.naa.gov.au.

A full list of projects funded by the GRDC is also available in Appendix B.

FOI requests

The GRDC received no requests under the FOI Act during 2009–10.

As a relatively small, specialist organisation operating in a market where competition for skilled staff is intense, the GRDC places high priority on looking after its people as well as managing its human resources effectively. This includes monitoring and rewarding individual performance; planning to secure the right suite of skills to meet the current and future needs of the GRDC; and providing a healthy work environment.

Performance management

Excellent performance is encouraged through the GRDC performance management process.

Twice each year, all staff undergo performance review according to agreed personal and corporate management objectives and organisational competencies. The dialogue between managers and their staff, which is continued between formal reviews, ensures that performance is aligned with the strategic direction of the organisation, allows support and realignment if necessary, and reaffirms strong performance. At the end of the year, the annual bonus scheme rewards excellent individual performance while also taking into account the overall performance of the organisation.

Recruitment, retention and succession management

During 2009–10, eight staff members were recruited to fill vacancies and three people moved roles within the GRDC.

The job market for quality staff continued to be tight despite the impact of the global financial crisis during the year. The strong reputation of the GRDC in the agricultural and research sectors has paid dividends in assisting to attract key people.

The GRDC values its people and aims to retain their services. Identifying why people choose to remain in the GRDC is important. The GRDC understands that people may choose to stay for financial and non-financial reasons. It recognises that people need to be well remunerated but that they also value training and development, a good organisational culture, extra staff benefits such as health initiatives and work–life balance, and the knowledge that the GRDC cares for all its staff members.

A formal succession planning and talent management process takes place yearly, when all staff are rated according to their potential to succeed in certain roles. Staff with good potential are identified and encouraged to develop their skills and trained to be able to take on new roles, should the opportunity arise. The succession plan is reviewed by the Board and is a successful retention tool, as staff are recognised for their skills and performance.

Workforce development

The GRDC encourages staff to undertake external education to enhance their skill set and professional development and continue their career growth, which eventually benefits GRDC business outcomes.

In 2009–10, one executive manager attended formal strategic leadership training, several staff members continued formal study and other members of staff attended short courses and conferences.

The GRDC is proud to have supported:

- three employees who undertook academic studies in such units as operations management, human resource management and government procurement
- 19 employees who attended self-development and leadership training programs.

All members of staff attended TRIM records management system training sessions. All staff also attended a defensive driver training course, after driving was identified as the highest occupational health and safety risk facing GRDC staff.

Monthly staff briefings and regular face-to-face communications such as social club activities and team-building excursions keep staff informed, involved, valued and cohesive in their commitment to and ownership of grains R&D and GRDC initiatives.

Australian Government Bargaining Framework

Under the Australian Government Bargaining Framework the GRDC is negotiating an enterprise agreement with members of staff and their elected representatives. The negotiations follow 'good faith bargaining' principles and aim to:

- keep the enterprise agreement as close as possible to current terms and conditions of employment, or improve on them
- promote productivity
- maintain our family-friendly culture and work environment
- enshrine accountability for compliance with the framework.

Equal employment opportunity

Staff are employed under terms and conditions consistent with the *Equal Employment Opportunity (Commonwealth Authorities) Act 1987* and the equal employment policy set out in the GRDC Operating Manual. Recent important changes to discrimination laws include a change in the definition of marital status to include same sex couples, highlight the importance of family responsibilities, include breastfeeding as a ground on which discrimination can occur, and impose a positive duty on employers to reasonably accommodate requests for flexible working arrangements.

The GRDC is proud to have a workplace population which is diverse in terms of ethnicity and cultural background yet harmonious and cohesive.

Analysis of the GRDC workforce for 2009–10 shows that, compared to last year, both the gender profile and the age profile remained steady. Table 26 shows the age and gender profile of GRDC staff for the past two reporting periods.

Disability strategies

In addition to offering terms and conditions consistent with equal employment opportunity, the GRDC ensures that its employment policies and procedures comply with the requirements of the *Disability Discrimination Act 1992*. The GRDC seeks to remove obstacles that may discourage people with disabilities from contributing to the work of the GRDC.

During 2009–10, progress in implementing the Commonwealth Disability Strategy included the following:

- All GRDC employment policies, procedures and practices complied with the requirements of the *Disability Discrimination Act 1992*, as amended by the *Disability Discrimination and Other Human Rights Legislation Amendment Act 2009*.
- All recruitment documentation provided by the GRDC was available in alternative forms, including in hard copy (provided on request) and on the GRDC website.
- Information and advice on 'reasonable adjustment' principles were provided to managers and recruiters on request.

Occupational health and safety

The GRDC's commitment is to achieve and maintain a safe, healthy and productive work environment for all employees, Board members, panel members, contractors and visitors to its workplace. The GRDC actively encourages a teamwork approach, cooperation and good communication as the tools to build a safe working environment. It complies with the *Occupational Health and Safety Act 1991* and takes all reasonably practicable steps to ensure a safe working environment.

During 2009–10 the GRDC conducted a review of its occupational health and safety (OH&S) policies and procedures and worked to implement changes resulting from the *Occupational Health and Safety (Commonwealth Employment) Amendment Act 2006*. The GRDC (in consultation with its employees) worked on the implementation of its Health and Safety Management Arrangements (HSMAs) as required under section 16(2)(d) of the *Occupational Health and Safety Act 1991*. The GRDC will use the HSMAs as one of the main mechanisms to demonstrate its commitment in meeting its duty of care. As part of the Comcare National Proactive Campaign, the GRDC participated in a survey in May 2010 to illustrate its adoption of the new HSMAs.

The Health and Safety Representative will continue to review the health and safety procedures in place and expand them where necessary.

TABLE 26:
Breakdown of staff by age and gender, 2008–09 and 2009–10

	2008–09		2009–10	
	Number	Percentage	Number	Percentage
20–30 years	11	22	6	12
30–40 years	14	29	17	34
40–50 years	10	20	14	28
50–60 years	13	27	12	24
>60 years	1	2	1	2
Female	24	49	23	46
Male	25	51	27	54
Total	**49**	**100**	**50**	**100**

Employees experiencing injuries or illness are offered support and flexibility for their transition back into the workplace. The GRDC has three qualified First Aid Officers and six fire wardens.

The GRDC is committed to assisting employees to maintain their health and wellbeing both at work and in life generally. Understanding that its people need to remain productive and positively engaged, the GRDC provides the tools they need to balance work, lifestyle and family commitments in a sustainable way.

Initiatives introduced to encourage and support employees to improve their health, general wellbeing and fitness include:

- offering free, annual flu vaccines
- continually updating information on reducing stress and keeping active, and ensuring that information from the Heart Foundation and CSIRO Family Healthy Living is readily available
- providing
  - flexibility to allow staff to participate in health promotion and fitness programs
  - a smoke-free workplace and access to related literature and/or quit programs
  - defensive driver training
  - access to counselling for staff and families through IPS Worldwide—Employee Assistance Program.

Table 27 provides a summary of activities undertaken during 2009–10 in relation to OH&S.

TABLE 27:

GRDC occupational health and safety performance

Indicators	Performance
Training and awareness of occupational health and safety (OH&S) requirements	Important activities conducted during the year included: • workstation assessments carried out for all staff, and workstation adjustments made as recommended • the purchase of eight chairs to meet ergonomic standards • training on – emergency procedures for new staff – senior first aid training for two staff members – business continuity management, for a team of 12 staff – defensive driver training for all staff • Comcare-accredited OH&S training for the Health and Safety Representative • the annual emergency building evacuation and fire drill • the annual check and restock of the first aid kit • an executive management response to the outbreak of the H1N1 flu virus, requiring staff to be vigilant and seek medical advice if unwell • the provision of flu vaccinations for 45 staff/Board members • a presentation to staff about the Employee Assistance Program • the establishment of more extensive OH&S policies.
Improved internal security arrangements	Compliance with the Protective Security Manual was implemented in stages. The internal alarm system was maintained.
Workplace facilities maintained to a high standard	Activities to ensure that facilities were well-maintained during the year included: • twice-yearly inspection of fire extinguishers • annual radiation check of microwave ovens • regular inspection of smoke detectors • painting, and cleaning of carpets. All electrical leads and power cords were checked and tagged, and all power outlets were fitted with safety cut-off switches.

Financial Statements

Hay baling in Calingiri, WA.
Photo: Evan Collis

Australian National
Audit Office

INDEPENDENT AUDITOR'S REPORT

To the Minister for Agriculture, Fisheries and Forestry

Scope

I have audited the accompanying financial statements of Grains Research and Development Corporation (the Corporation) for the year ended 30 June 2010, which comprise: a Statement by the Directors and Chief Finance Officer, Statement of Comprehensive Income; Balance Sheet; Statement of Changes in Equity; Cash Flow Statement; Schedule of Commitments; Schedule of Asset Additions; and Notes to and forming part of the Financial Statements, including a Summary of Significant Accounting Policies.

The Directors' Responsibility for the Financial Statements

The directors are responsible for the preparation and fair presentation of the financial statements in accordance with the Finance Minister's Orders made under the *Commonwealth Authorities and Companies Act 1997*, including the Australian Accounting Standards (which include the Australian Accounting Interpretations). This responsibility includes establishing and maintaining internal controls relevant to the preparation and fair presentation of the financial statements that are free from material misstatement, whether due to fraud or error; selecting and applying appropriate accounting policies; and making accounting estimates that are reasonable in the circumstances.

Auditor's Responsibility

My responsibility is to express an opinion on the financial statements based on my audit.

I have conducted my audit in accordance with the Australian National Audit Office Auditing Standards, which incorporate the Australian Auditing Standards. These auditing standards require that I comply with relevant ethical requirements relating to audit engagements and plan and perform the audit to obtain reasonable assurance whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error.

GPO Box 707 CANBERRA ACT 2601
19 National Circuit BARTON ACT 2600
Phone (02) 6203 7300 Fax (02) 6203 7777

In making those risk assessments, the auditor considers internal control relevant to the Corporation's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Corporation's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by the directors, as well as evaluating the overall presentation of the financial statements.

I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my audit opinion.

Independence

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

Auditor's Opinion

In my opinion, the financial statements of 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*, including the Australian Accounting Standards; and

(b) give a true and fair view of the matters required by the Finance Minister's Orders including Grains Research and Development Corporation's financial position as at 30 June 2010 and its financial performance and cash flows for the year then ended.

Australian National Audit Office

Mark A Moloney
Senior Director
Delegate of the Auditor-General
Canberra
12 August 2010

Statement by directors and chief financial officer

In our opinion, the attached financial statements for the year ended 30 June 2010 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*, as amended.

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 K G Perrett
CHAIRMAN
11 August 2010

Signed .....

Mr P F Reading
MANAGING DIRECTOR
11 August 2010

Signed .....

Mr G F Whiteley
CHIEF FINANCIAL OFFICER
11 August 2010

Statement of comprehensive income

FOR THE PERIOD ENDED 30 JUNE 2010

	Notes	2010 $'000	2009 $'000
EXPENSES			
Research and development	3A	**116,751**	106,252
Employee benefits	3B	**6,453**	6,104
Supplier expense	3C	**5,572**	5,194
Depreciation and amortisation	3D	**377**	411
Write-down and impairment of assets	3E	**4,217**	3,311
Total expenses		**133,370**	121,272
LESS:			
OWN-SOURCE INCOME			
Own-source revenue			
Interest	4A	**7,015**	10,010
Industry contributions	4B	**74,065**	89,207
Project refunds	4C	**784**	2,207
Royalties	4D	**2,412**	2,003
Grants income	4E	**8,924**	2,632
Other	4F	**541**	430
Total own-source revenue		**93,741**	106,489
Gains			
Sale of assets	4G	**4**	31
Total gains		**4**	31
Total own-source income		**93,745**	106,520
Net cost of services		**39,625**	14,752
Revenue from Government	4H	**50,071**	43,896
Share of (deficit) of associates and joint ventures accounted for using the equity method	5D	**(598)**	(672)
Surplus attributable to the Australian Government		**9,848**	28,472
OTHER COMPREHENSIVE INCOME			
Changes in asset revaluation reserves	6B	**—**	524
Total other comprehensive income		**—**	524
Total comprehensive income		**9,848**	28,996
Total comprehensive income attributable to the Australian Government		**9,848**	28,996

The above statement should be read in conjunction with the accompanying notes.

Balance sheet

AS AT 30 JUNE 2010

	Notes	2010 $'000	2009 $'000
ASSETS			
Financial assets			
Cash and cash equivalents	5A	**33,905**	33,104
Trade and other receivables	5B	**11,763**	20,953
Investments	5C	**115,412**	89,806
Investments accounted for using the equity method	5D	**544**	288
Investments—other	5E	**7,902**	7,326
Total financial assets		**169,526**	151,477
Non-financial assets			
Land and buildings	6A, D	**5,694**	5,890
Infrastructure, plant and equipment	6B, D	**312**	324
Intangibles	6C, D	**259**	325
Other	6E	**918**	1,079
Total non-financial assets		**7,183**	7,618
Total Assets		**176,709**	159,095
LIABILITIES			
Provisions			
Employee provisions	7A	**1,233**	1,036
Total provisions		**1,233**	1,036
Payables			
Suppliers	8A	**2,014**	741
Research and development	8B	**44,924**	38,628
Total payables		**46,938**	39,369
Total Liabilities		**48,171**	40,405
Net Assets		**128,538**	118,690
EQUITY			
Retained surplus		**55,683**	50,439
Asset revaluation reserve		**3,361**	3,361
Capital commitment reserve		**182**	2,621
Contracted research reserve		**69,312**	62,269
Total Equity		**128,538**	118,690

The above statement should be read in conjunction with the accompanying notes.

Statement of changes in equity

AS AT 30 JUNE 2010

	Retained surplus		Asset revaluation reserve		Contracted research reserve		Capital commitment reserve		TOTAL EQUITY	
	2010 $'000	2009 $'000	2010 $'000	2009 $'000	2010 $'000	2009 $'000	2010 $'000	2009 $'000	2010 $'000	2009 $'000
Opening balance										
Balance carried forward from previous period	**50,439**	22,105	**3,361**	2,837	**62,269**	59,895	**2,621**	4,857	**118,690**	89,694
Adjusted opening balance	**50,439**	22,105	**3,361**	2,837	**62,269**	59,895	**2,621**	4,857	**118,690**	89,694
Comprehensive income										
Other comprehensive income	**—**	—	**—**	524	**—**	—	**—**	—	**—**	524
Surplus for the period	**9,848**	28,472	**—**	—	**—**	—	**—**	—	**9,848**	28,472
Total comprehensive income	**9,848**	28,472	**—**	524	**—**	—	**—**	—	**9,848**	28,996
of which:										
Attributable to the Australian Government	**9,848**	28,472	**—**	524	**—**	—	**—**	—	**9,848**	28,996
Transfers between equity components	**(4,604)**	(138)	**—**	—	**7,043**	2,374	**(2,439)**	(2,236)	**—**	—
Closing balance as at 30 June	**55,683**	50,439	**3,361**	3,361	**69,312**	62,269	**182**	2,621	**128,538**	118,690
Closing balance attributable to the Australian Government	**55,683**	50,439	**3,361**	3,361	**69,312**	62,269	**182**	2,621	**128,538**	118,690

The above statement should be read in conjunction with the accompanying notes.

Cash flow statement

FOR THE PERIOD ENDED 30 JUNE 2010

	Notes	2010 $'000	2009 $'000
OPERATING ACTIVITIES			
Cash received			
Industry contributions		**74,252**	89,074
Commonwealth contributions		**59,578**	36,928
Interest		**6,365**	7,414
Grants income		**10,347**	2,895
Other		**4,520**	5,074
Total cash received		**155,062**	141,385
Cash used			
Research and development		**110,272**	94,864
Employees		**6,256**	6,023
Suppliers		**4,292**	5,273
Net GST paid		**2,704**	1,735
Total cash used		**123,524**	107,895
Net cash from operating activities	9(b)	**31,538**	33,490
INVESTING ACTIVITIES			
Cash received			
Investments		**—**	15,006
Total cash received		**—**	15,006
Cash used			
Purchase of property, plant and equipment		**103**	370
Investments		**24,988**	20,870
Shares		**5,646**	6,278
Total cash used		**30,737**	27,518
Net cash (used by) investing activities		**(30,737)**	(12,512)
Net increase in cash held		**801**	20,978
Cash and cash equivalents at the beginning of the reporting period		**33,104**	12,126
Cash and cash equivalents at the end of the reporting period	5A, 9(a)	**33,905**	33,104

The above statement should be read in conjunction with the accompanying notes.

Schedule of commitments

AS AT 30 JUNE 2010

	Notes	2010 $'000	2009 $'000
BY TYPE			
Commitments payable			
Capital commitments			
Investments[1]		182	2,621
Total capital commitments		182	2,621
Other commitments			
Operating leases[2]		301	195
Research projects forward program[3]		174,326	164,509
Total other commitments		174,627	164,704
Commitments receivable			
GST recoverable on commitments		(15,875)	(14,973)
Total commitments receivable		(15,875)	(14,973)
Net commitments by type		158,934	152,352
BY MATURITY			
Commitments payable			
Capital commitments			
One year or less		182	2,439
From one year to five years		—	182
Total capital commitments		182	2,621
Research project commitments			
One year or less		92,617	70,710
From one to five years		81,709	93,799
Over five years		—	—
Research projects commitments		174,326	164,509
Operating lease commitments			
One year or less		149	104
From one year to five years		152	91
Over five years		—	—
Total operating lease commitments		301	195
Commitments receivable			
One year or less		(8,433)	(6,438)
From one year to five years		(7,442)	(8,535)
Over five years		—	—
Total commitments receivable		(15,875)	(14,973)
Net Commitments by maturity		158,934	152,352

NB: Commitments are GST inclusive where relevant.

The above statement should be read in conjunction with the accompanying notes.

Schedule of commitments *(continued)*

AS AT 30 JUNE 2010

1 Capital commitments for 2009–10 are GRDC's commitment to purchase shares in HRZ Wheats Pty Ltd.

2 Operating leases comprise:

Nature of the lease	*General description of leasing arrangement*
Motor vehicles—staff	Leased as part of salary packages No contingent rentals exist
Photocopier and franking machine	Rental agreements for a period of 5 years exist for the photocopier and franking machine, after this time they are usually replaced with new rental equipment

3 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 2010.

The above schedule should be read in conjunction with the accompanying notes.

Schedule of asset additions

FOR THE PERIOD ENDED 30 JUNE 2010

The following non-financial non-current assets were added in 2009–10:

	Land	Buildings	Other Infrastructure, Plant & Equipment	Intangibles	Total
	$'000	**$'000**	**$'000**	**$'000**	**$'000**
By purchase—other	**—**	**—**	**78**	**25**	**103**
Total additions	**—**	**—**	**78**	**25**	**103**

The following non-financial non-current assets were added in 2008–09:

	Land	Buildings	Other Infrastructure, Plant & Equipment	Intangibles	Total
	$'000	$'000	$'000	$'000	$'000
By purchase—other	—	—	154	216	370
Total additions	—	—	154	216	370

The above schedule should be read in conjunction with the accompanying notes.

FOR THE YEAR ENDED 30 JUNE 2010

Note 1: Summary of Significant Accounting Policies

1.1 OBJECTIVE OF THE GRDC

The Grains Research and Development Corporation (the Corporation) is an Australian Government controlled entity, established in 1990 as a statutory corporation under the *Primary Industries and Energy Research and Development Act 1989*. Its primary objective is to support effective competition by Australian grain growers in global grain markets, through enhanced profitability and sustainability. By strategically investing in research and development (R&D) and the delivery of R&D outputs, the Corporation works to achieve one outcome:

Outcome 1—New information and products that enhance the productivity, competitiveness and environmental sustainability of Australian grain growers and benefit the industry and wider community, through planning, managing and implementing investments in grains research and development.

The continued existence of the Corporation in its present form and with its present programs is dependent on Government policy.

1.2 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 general purpose financial statements.

The financial statements have been prepared in accordance with:

- Finance Minister's Orders (FMO) for reporting periods ending on or after 1 July 2009; and
- Australian Accounting Standards and Interpretations issued by the Australian Accounting Standards Board (AASB) that apply for the reporting period.

The financial statements have been prepared on an accrual basis and in accordance with historical cost convention, except for certain assets and liabilities 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 statements are presented in Australian dollars and values are rounded to the nearest thousand dollars unless otherwise specified.

Unless an alternative treatment is specifically required by an accounting standard or the FMO, assets and liabilities are recognised in the Balance Sheet when and only when it is probable that future economic benefits will flow to the Corporation or a future sacrifice of economic benefits will be required and the amounts of the assets or 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.

Unless alternative treatment is specifically required by an accounting standard, income and expenses are recognised in the Statement of Comprehensive Income when, and only when, the flow, consumption or loss of economic benefits has occurred and can be reliably measured.

1.3 SIGNIFICANT ACCOUNTING JUDGEMENTS AND ESTIMATES

In the process of applying the accounting policies listed in this note, the Corporation has made the following estimates that have the most significant impact on the amounts recorded in the financial statements:

- The valuation of unlisted shares held by the Corporation (as detailed in note 1.13) at each balance date is equivalent to the Corporation's share of net assets of each company.

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

Note 1: Summary of Significant Accounting Policies *(continued)*

1.4 NEW AUSTRALIAN ACCOUNTING STANDARDS

Adoption of new Australian Accounting Standard Requirements

No accounting standard has been adopted earlier than the application date as stated in the standard.

The following new standards, amendments to standards or interpretations were issued prior to the signing of the Statement by Directors and Chief Financial Officer, were applicable to the current reporting period:

Standard/Interpretation		Impact on the Corporation
AASB 8	Operating Segments	None
AASB 101	Presentation of Financial Statements	Changes to terminology, Income Statement replaced by Statement of Comprehensive Income, revised Statement of Changes in Equity
AASB 123	Borrowing Costs	None
AASB 1039	Concise Financial Reports	None
AASB 2007–3	Amendments to Australian Accounting Standards arising from AASB 8 [AASB 5, AASB 6, AASB 102, AASB 107, AASB 119, AASB 127, AASB 134, AASB 136, AASB 1023 & AASB 1038]	None
AASB 2007–6	Amendments to Australian Accounting Standards arising from AASB 123 [AASB 1, AASB 101, AASB 107, AASB 111, AASB 116 & AASB 138, and Interpretations 1 & 12]	None
AASB 2007–8	Amendments to Australian Accounting Standards arising from AASB 101	None
AASB 2007–10	Further Amendments to Australian Accounting Standards arising from AASB 101	None
AASB 2008–1	Amendments to Australian Accounting Standard—Share-based Payments: Vesting Conditions and Cancellations [AASB 2]	None
AASB 2008–2	Amendments to Australian Accounting Standards—Puttable Financial Instruments and Obligations arising on Liquidation [AASB 7, AASB 101, AASB 132 & AASB 139 and Interpretation 2]	None
AASB 2008–5	Amendments to Australian Accounting Standards arising from the Annual Improvements Project [AASBs 5, 7, 101, 102, 107, 108, 110, 116, 118, 119, 120, 123, 127, 128, 129, 131, 132, 134, 136, 138, 139, 140, 141, 1023 & 1038]	None
AASB 2008–7	Amendments to Australian Accounting Standards—Cost of an Investment in a Subsidiary, Jointly Controlled Entity or Associate [AASB 1, AASB 118, AASB 121, AASB 127 & AASB 136]	None
AASB 2008–9	Amendments to AASB 1049 for Consistency with AASB 101	None
AASB 2009–1	Amendments to Australian Accounting Standards—Borrowing Costs of Not-for-Profit Public Sector Entities [AASB 1, AASB 111 & AASB 123]	None
AASB 2009–2	Amendments to Australian Accounting Standards—Improving Disclosures about Financial Instruments [AASB 4, AASB 7, AASB 1023 & AASB 1038]	Additional disclosure—fair value measurements to be categorised by fair value hierarchy
AASB 2009–6	Amendments to Australian Accounting Standards	None
ERR	Erratum: General Terminology Changes [AASB 1, 112, 121, 139, 141, 1023 & 1038 and Interpretation 7 &10]	None
AASB 1	First-time Adoption of Australian Accounting Standards	None
AASB 3	Business Combinations	None
AASB 127	Consolidated and Separate Financial Statements	None

Note 1: Summary of Significant Accounting Policies *(continued)*

1.4 NEW AUSTRALIAN ACCOUNTING STANDARDS *(continued)*

Standard/Interpretation		Impact on the Corporation
AASB 2008–3	Amendments to Australian Accounting Standards arising from AASB 3 and AASB 127 [AASBs 1, 2, 4, 5, 7, 101, 107, 112, 114, 116, 121, 128, 131, 132, 133, 134, 136, 137, 138 & 139 and Interpretations 9 & 107]	None
AASB 2008–6	Further Amendments to Australian Accounting Standards arising from the Annual Improvements Project [AASB 1 & AASB 5]	None
AASB 2008–8	Amendments to Australian Accounting Standards—Eligible Hedged Items [AASB 139]	None
AASB 2008–11	Amendments to Australian Accounting Standard—Business Combinations Among Not-for-Profit Entities [AASB 3]	None
AASB 2008–13	Amendments to Australian Accounting Standards arising from AASB Interpretation 17—Distribution of Non-cash Assets to Owners [AASB 5 & AASB 110]	None
AASB 2009–4	Amendments to Australian Accounting Standards arising from the Annual Improvements Project [AASB 2 & AASB 138 and AASB Interpretations 9 & 16]	None
AASB 2009–7	Amendments to Australian Accounting Standards [AASB 5, 7, 107, 112, 136 & 139 and Interpretation 17]	None
Interpretation 16	Hedges of a Net Investment in A Foreign Operation	None
Interpretation 15	Agreements for the Construction of Real Estate	None
Interpretation 17	Distribution of Non-cash Assets to Owners	None
Interpretation 18	Transfers of Assets from Customers	None

Future Australian Accounting Standard Requirements

The following new standards, amendments to standards or interpretations were issued by the Australian Accounting Standards Board prior to the signing of the Statement by Directors and Chief Financial Officer:

Standard/Interpretation		Impact on the Corporation
AASB 2009–5	Further Amendments to Australian Accounting Standards arising from the Annual Improvements Project [AASB 5, 8, 101 ,107, 117, 118, 136 & 139]	None
AASB 2009–8	Amendments to Australian Accounting Standards—Group Cash-settled Share-based Payment Transactions [AASB 2]	None
AASB 2009–9	Amendments to Australian Accounting Standards—Additional Exemptions for First-time Adopters [AASB 1]	None
AASB 2009–10	Amendments to Australian Accounting Standards—Classification of Rights Issues [AASB 132]	None
Interpretation 19	Extinguishing Financial Liabilities with Equity Instruments	None
AASB 2009–13	Amendments to Australian Accounting Standards arising from Interpretation 19 [AASB 1]	None
AASB 2010–1	Amendments to Australian Accounting Standards—Limited Exemption from Comparative AASB 7 Disclosures for First-time Adopters	None
AASB 2010–3	Amendments to Australian Accounting Standards arising from the Annual Improvements Project [AASB 3, AASB 7, AASB 121, AASB 128, AASB 131, AASB 132 & AASB 139]	None
AASB 2009–12	Amendments to Australian Accounting Standards [AASBs 5, 8, 108, 110, 112, 119, 133, 137, 139, 1023 & 1031 and Interpretations 2, 4, 16, 1039 & 1052]	None
AASB 124	Related Party Disclosures	None

Note 1: Summary of Significant Accounting Policies *(continued)*

1.4 NEW AUSTRALIAN ACCOUNTING STANDARDS *(continued)*

Standard/Interpretation		Impact on the Corporation
AASB 2009–14	Amendments to Australian Interpretation—Prepayments of a Minimum Funding Requirement [AASB Interpretation 14]	None
AASB 2010–4	Further Amendments to Australian Accounting Standards arising from the Annual Improvements Project [AASB 1, AASB 7, AASB 101 & AASB 134 and Interpretation 13]	None
AASB 2009–11	Amendments to Australian Accounting Standards arising from AASB 9 [AASBs 1, 3, 4, 5, 7, 101, 102, 108, 112, 118, 121, 127, 128, 131, 132, 136, 139, 1023 & 1038 and Interpretations 10 & 12]	None
AASB 9	Financial Instruments	Reduction in the number of financial asset categories to two, being amortised cost and fair value
AASB 1053	Application of Tiers of Australian Accounting Standards	None
AASB 2010–2	Amendments to Australian Accounting Standards arising from Reduced Disclosure Requirements [AASB 1, 2, 3, 5, 7, 8, 101, 102, 107, 108, 110, 111, 112, 116, 117, 119, 121, 123, 124, 127, 128, 131, 133, 134, 136, 137, 138, 140, 141, 1050 & 1052 and Interpretations 2, 4, 5, 15, 17, 127, 129 & 1052]	None

1.5 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 *Financial Instruments: Recognition and Measurement.*

Project refunds

Project refunds are recognised upon receipt of the refund when it relates to prior years 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.

Grants income

Grants income is revenue paid to the Corporation for the purpose of funding specific research and development projects. Grants and other non-reciprocal contributions are recognised as revenue when the Corporation obtains control over the assets comprising the contributions. Control is normally obtained upon receipt.

Note 1: Summary of Significant Accounting Policies *(continued)*

1.6 GAINS

Sale of assets

Gains from the disposal of assets are recognised when control of the asset has passed to the buyer.

1.7 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 (with the exception of investments in equity instruments that do not have a quoted market price in an active market and whose fair value cannot be reliably measured) 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 income at their fair value at the date of acquisition.

1.8 PROPERTY, 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

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
Infrastructure, plant & equipment	Market selling price

Following initial recognition at cost, property, plant and equipment are carried at fair value less subsequent accumulated depreciation and accumulated impairment losses. Valuations are conducted with sufficient frequency to ensure that the carrying amounts of assets do not materially differ from 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 in the surplus/deficit. Revaluation decrements for a class of assets are recognised directly in the surplus/deficit 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 to the Corporation using, in all cases, the straight-line method of depreciation.

Depreciation rates (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.

Note 1: Summary of Significant Accounting Policies *(continued)*

1.8 PROPERTY, PLANT AND EQUIPMENT *(continued)*

Depreciation (continued)

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

	2010	2009
Buildings on leasehold land	**25 years**	25 years
Other infrastructure, plant & equipment	**3 to 12 years**	3 to 12 years

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 (2009: $NIL).

Impairment

All assets were assessed for impairment at 30 June 2010. 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 that 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.

Derecognition

An item of property, plant and equipment is derecognised upon disposal or when no further economic benefits are expected from its use or disposal.

1.9 INTANGIBLES

Software

These intangible assets comprise software for internal use. Software is carried at cost less accumulated amortisation and accumulated impairment losses.

Software is amortised on a straight-line basis over its anticipated useful life as follows:

	2010	2009
Information management system	**2.5 years**	2.5 years
Other software	**4 years**	4 years

Development costs

Research costs are expensed when incurred. An intangible asset arising from development expenditure is only recognised when technical feasibility studies identify that the expenditure will deliver future economic benefits and these benefits can be measured reliably. Other development expenditure is recognised in the Statement of Comprehensive Income as an expense when incurred.

Following initial recognition of development expenditure, the cost model is applied requiring the asset to be carried at cost less any accumulated amortisation and accumulated impairment losses.

All intangible assets were assessed for indications of impairment as at 30 June 2010.

1.10 EMPLOYEE BENEFITS

Liabilities for short-term employee benefits (as defined in AASB 119) and termination benefits due within twelve months of the end of the reporting period 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.

Other long-term benefits are measured as net total of the present value of the defined benefit obligation at the end of the reporting period minus the fair value at the end of the reporting period of plans assets (if any) out of which the obligations are to be settled directly.

Note 1: Summary of Significant Accounting Policies *(continued)*

1.10 EMPLOYEE BENEFITS *(continued)*

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 at the estimated salary rates that apply at the time the leave is taken, 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.

The liability for long service leave has been determined by using the Australian Government shorthand method. In applying this method, the accrued long service leave for each employee as at reporting date is probability weighted, based on the Australian Government probability profile. The amount obtained for each employee is then discounted using the ten year Treasury Bond rate. The total estimated liability for the Corporation is the sum of the liabilities for each employee. The estimate of the present value of the liability takes into account attrition rates and pay increases through promotion and inflation.

Separation and redundancy

Provision is made for separation and redundancy benefit payments. The Corporation recognises a provision for termination when it has developed a detailed formal plan for the terminations and has informed those employees affected that it will carry out the terminations.

Superannuation

Staff of the Corporation are members of the Commonwealth Superannuation Scheme (CSS), the Public Sector Superannuation Scheme (PSS), the PSS accumulation plan (PSSap), the Australian Government Employees Superannuation Trust (AGEST) or an approved superannuation scheme of their choice.

The CSS and PSS are defined benefit schemes for the Australian Government. The PSSap is a defined contribution scheme.

The liability for defined benefits is recognised in the financial statements of the Australian Government and is settled by the Australian Government in due course. This liability is reported by the Department of Finance and Deregulation as an administered item.

For CSS and PSS members, the Corporation makes contributions based on the rates determined by an actuary to be sufficient to meet the current costs to the Government of the superannuation entitlements of the Corporation's employees. The Corporation accounts for the contributions as if they were contributions to defined contribution plans.

For AGEST and other approved superannuation schemes, the Corporation contributes a minimum of 9% of superannuable salaries.

As at 30 June, all superannuation contributions were fully paid, therefore no superannuation liability has been recognised (2009: $NIL).

1.11 LEASES

A distinction is made between finance leases and operating leases. Finance leases effectively transfer from the lessor to the lessee substantially all the risks and rewards incidental to ownership of leased 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 straight-line basis which is representative of the pattern of benefits derived from the leased assets.

1.12 CASH

Cash and cash equivalents includes cash on hand and demand deposits in bank accounts with an original maturity of 3 months or less that are readily convertible to known amounts of cash and subject to insignificant risk of changes in value. Cash is recognised at its nominal amount.

Note 1: Summary of Significant Accounting Policies *(continued)*

1.13 FINANCIAL ASSETS

The Corporation classifies its financial assets in the following categories:

- financial assets at fair value through profit or loss;
- held-to-maturity investments;
- available-for-sale financial assets; and
- loans and receivables.

The classification depends on the nature and purpose of the financial assets and is determined at the time of initial recognition.

Financial assets are recognised and derecognised upon trade date.

Effective interest method

The effective interest method is a method of calculating the amortised cost of a financial asset and of allocating interest income over the relevant period. The effective interest rate is the rate that exactly discounts estimated future cash receipts through the expected life of the financial asset, or, where appropriate, a shorter period.

Income is recognised on an effective interest rate basis except for financial assets at fair value through profit or loss.

Financial assets at fair value through profit or loss

Financial assets are classified as financial assets at fair value through profit or loss where the financial assets:

- have been acquired principally for the purpose of selling in the near future;
- are a part of an identified portfolio of financial instruments that the Corporation manages together and has a recent actual pattern of short-term profit-taking; or
- are derivatives that are not designated and effective as a hedging instrument.

Assets in this category are classified as current assets.

Financial assets at fair value through profit or loss are stated at fair value, with any resultant gain or loss recognised in profit or loss. The net gain or loss recognised in profit or loss incorporates any interest earned on the financial asset.

Available-for-sale financial assets

Available-for-sale financial assets are non-derivatives that are either designated in this category or not classified in any of the other categories.

Available-for-sale financial assets are recorded at fair value. Gains and losses arising from changes in fair value are recognised directly in reserves (equity) with the exception of impairment losses. Interest is calculated using the effective interest method and foreign exchange gains and losses on monetary assets are recognised directly in profit or loss. Where the asset is disposed of or is determined to be impaired, part (or all) of the cumulative gain or loss previously recognised in the reserve is included in profit and loss for the period.

Where a reliable fair value cannot be established for unlisted investments in equity instruments, cost is used. The Corporation has acquired shares in the following unlisted companies:

- Australian Grain Technologies Pty Ltd (holding: 39.11%);
- Australian Centre for Plant Functional Genomics Pty Ltd (holding: 19.30%);
- Arista Cereal Technologies Pty Ltd (holding: 19.44%);
- InterGrain Pty Ltd (holding: 35.54%); and
- Canola Breeders Western Australia Pty Ltd (holding: 30.97%).

Note 1: Summary of Significant Accounting Policies *(continued)*

1.13 FINANCIAL ASSETS *(continued)*

Available-for-sale financial assets (continued)

The above companies conduct research and development activities relating to seed technology, new wheat varieties, high amylose wheat and the development of canola varieties. 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 in share value* 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 successfully marketed product or service and an active market for the investment exists. The investment would then be measured at fair value.

Held-to-maturity investments

Non-derivative financial assets with fixed or determinable payments and fixed maturity dates that the Corporation has the positive intent and ability to hold to maturity are classified as held-to-maturity investments. Held-to-maturity investments are recorded at amortised cost using the effective interest method less impairment, with revenue recognised on an effective yield basis.

Loans and receivables

Trade receivables, loans and other receivables that have fixed or determinable payments that are not quoted in an active market are classified as "loans and receivables". Loans and receivables are measured at amortised cost using the effective interest method less impairment. Interest is recognised by applying the effective interest rate.

Impairment of financial assets

Financial assets are assessed for impairment at the end of each reporting period.

- *Financial assets held at amortised cost*—if there is objective evidence that an impairment loss has been incurred for loans and receivables or held-to-maturity investments held at amortised cost, the amount of the loss is measured as the difference between the asset's carrying amount and the present value of estimated future cash flows discounted at the asset's original effective interest rate. The carrying amount is reduced by way of an allowance account. The loss is recognised in the Statement of Comprehensive Income.
- *Available-for-sale financial assets*—if there is objective evidence that an impairment loss on an available-for-sale financial asset has been incurred, the amount of the difference between its cost, less principal repayments and amortisation, and its current fair value, less any impairment loss previously recognised in expenses, is transferred from equity to the Statement of Comprehensive Income.
- *Financial assets held at cost*—if there is objective evidence that an impairment loss has been incurred, the amount of the impairment loss is the difference between the carrying amount of the asset and the present value of the estimated future cash flows discounted at the current market rate for similar assets.

1.14 FINANCIAL LIABILITIES

Financial liabilities are classified as either financial liabilities at fair value through profit or loss or other financial liabilities.

Financial liabilities are recognised and derecognised upon trade date.

Financial liabilities at fair value through profit or loss

Financial liabilities at fair value through profit or loss are initially measured at fair value. Subsequent fair value adjustments are recognised in profit or loss. The net gain or loss recognised in profit or loss incorporates any interest paid on the financial liability.

Other financial liabilities

Other financial liabilities, including borrowings, are initially measured at fair value, net of transaction costs.

Other financial liabilities are subsequently measured at amortised cost using the effective interest method, with interest expense recognised on an effective yield basis.

Note 1: Summary of Significant Accounting Policies *(continued)*

1.14 FINANCIAL LIABILITIES *(continued)*

Other financial liabilities (continued)

The effective interest method is a method of calculating the amortised cost of a financial liability and of allocating interest expense over the relevant period. The effective interest rate is the rate that exactly discounts estimated future cash payments through the expected life of the financial liability, or, where appropriate, a shorter period.

Supplier and other payables are recognised at amortised cost. Liabilities are recognised to the extent that the goods or services have been received (and irrespective of having been invoiced).

1.15 INVESTMENTS IN ASSOCIATES

The Corporation's investments in its associates are accounted for using the equity method.

Under the equity method, investments in associates are carried in the Corporation's Balance Sheet at cost as adjusted for post-acquisition changes in the Corporation's share of net assets of the associates. Goodwill relating to an associate is included in the carrying amount of the investment. After the application of the equity method, the Corporation determines whether it is necessary to recognise any impairment loss with respect to the net investment in associates.

1.16 TAXATION

The Corporation is subject to taxation (other than income tax) under the laws of the Commonwealth under section 46(1) of the *Primary Industries and Energy Research and Development Act 1989*.

Revenues, expenses and assets are recognised net of Goods and Services Tax (GST) except:

- where the amount of GST incurred is not recoverable from the Australian Taxation Office; and
- for receivables and payables.

1.17 CONTINGENT LIABILITIES AND CONTINGENT ASSETS

Contingent liabilities and contingent assets are not recognised in the Balance Sheet but are reported in the relevant schedules and notes. They may arise from uncertainty as to the existence of a liability or asset, or represent an asset or liability in respect of which the amount cannot be reliably measured. Contingent assets are disclosed when settlement is probable but not virtually certain and contingent liabilities are disclosed when settlement is greater than remote.

As at 30 June 2010 the Corporation held no contingent liabilities or contingent assets.

Note 2: Events After the Reporting Period

The Corporation had no events occurring after the reporting date that would significantly affect its ongoing structure and financial activities.

Note 3: Expenses

NOTE 3A: RESEARCH AND DEVELOPMENT

2010	Cross-commodity $'000	Coarse grains $'000	Grain legumes $'000	Oilseeds $'000	Wheat $'000	Total $'000
National	65,202	3,900	4,025	506	4,374	78,007
Northern region	7,282	759	—	852	989	9,882
Southern region	14,679	1,949	613	991	429	18,661
Western region	8,716	—	434	750	301	10,201
TOTAL	95,879	6,608	5,072	3,099	6,093	116,751
2009	77,254	9,292	7,411	4,809	7,486	106,252

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.

	2010 $'000	2009 $'000
NOTE 3B: EMPLOYEE BENEFITS		
Salaries and wages	5,489	5,232
Superannuation		
Defined contribution plans	633	690
Defined benefits plans	133	134
Leave and other entitlements	198	48
Total employee benefits	6,453	6,104
NOTE 3C: SUPPLIERS		
Goods and services		
Staff travel and accommodation	1,145	982
Consultants	28	75
Panel expenses	928	922
Program team expenses	663	509
Communications	128	81
Corporate governance	327	318
Corporate services	1,143	1,120
Legal and procurement	220	228
Levy collection costs	551	548
Other	426	397
Total goods and services	5,559	5,180
Goods and services are made up of:		
Provision of goods—external parties	139	156
Rendering of services—external parties	5,420	5,024
Total goods and services	5,559	5,180
Other supplier expenses		
Operating lease rentals—external parties		
Minimum lease payments	13	14
Total other supplier expenses	13	14
Total supplier expenses	5,572	5,194

Note 3: Expenses *(continued)*

	2010 $'000	2009 $'000
NOTE 3D: DEPRECIATION AND AMORTISATION		
Depreciation:		
Infrastructure, plant and equipment	90	71
Buildings	196	192
Total depreciation	286	263
Amortisation:		
Intangibles:		
Information Management System	18	100
Software	73	48
Total amortisation	91	148
Total depreciation and amortisation	377	411
NOTE 3E: WRITE-DOWN AND IMPAIRMENT OF ASSETS		
Investments (shares)—revaluation decrement	4,217	3,311

Note 4: Income

	2010 $'000	2009 $'000
REVENUE		
NOTE 4A: INTEREST		
Deposits	6,680	7,576
Negotiable certificates of deposit	—	82
Sub-total interest income	6,680	7,658
Management fee	(283)	(258)
Revaluation of investments	618	2,610
Total interest	7,015	10,010
NOTE 4B: INDUSTRY CONTRIBUTIONS		
Coarse grains	14,243	22,658
Grain legumes	6,115	5,033
Oilseeds	8,573	9,176
Wheat	45,134	52,340
Total industry contributions	74,065	89,207
NOTE 4C: PROJECT REFUNDS		
Cross commodity	530	829
Coarse grains	10	183
Grain legumes	116	63
Oilseeds	33	110
Wheat	95	1,022
Total project refunds	784	2,207

Note 4: Income *(continued)*

	2010 $'000	2009 $'000
REVENUE *(continued)*		
NOTE 4D: ROYALTIES		
Coarse grains	775	875
Grain legumes	448	356
Oilseeds	79	227
Wheat	1,090	402
Other	20	143
Total royalties	2,412	2,003
NOTE 4E: GRANTS INCOME		
Commonwealth	7,723	2,473
Industry	1,201	159
Total grants income	8,924	2,632
NOTE 4F: OTHER REVENUE		
Levy penalties	92	94
Groundcover advertising income	184	227
Publications revenue	82	99
Other income	183	10
Total other revenue	541	430
GAINS		
NOTE 4G: SALE OF ASSETS		
Non-current assets held for sale		
Proceeds from sale	4	31
Carrying value of assets sold	—	—
Net gain from sale of assets	4	31
REVENUE FROM GOVERNMENT		
NOTE 4H: REVENUE FROM GOVERNMENT		
Commonwealth contributions	50,071	43,896
Total revenue from Government	50,071	43,896

Note 5: Financial Assets

	2010 $'000	2009 $'000
NOTE 5A: CASH AND CASH EQUIVALENTS		
Interest bearing cheque account	607	205
Money market call account	22,949	22,899
Business online saver account	10,349	10,000
Total cash and cash equivalents	33,905	33,104

Note 5: Financial Assets *(continued)*

	2010 $'000	2009 $'000
NOTE 5B: TRADE AND OTHER RECEIVABLES		
Goods and services—related entities	**6,257**	15,950
Goods and services—external parties	**598**	1,375
GST receivable from the Australian Taxation Office	**4,908**	3,628
Total trade and other receivables	**11,763**	20,953
Receivables are aged as follows:		
Not overdue	**11,677**	20,953
Overdue by:		
Less than 30 days	**43**	—
30 to 60 days	**—**	—
61 to 90 days	**18**	—
more than 90 days	**25**	—
	86	—
Total receivables	**11,763**	20,953

All receivables are expected to be recovered in no more than 12 months.

No indicators of impairment were found for trade and other receivables.

Receivables for goods & services

Credit terms are net 7 days (2009: 7 days).

NOTE 5C: INVESTMENTS		
BT Individually Managed Fund At market value	**57,465**	44,682
UBS Individually Managed Fund At market value	**57,947**	45,124
Total investments	**115,412**	89,806

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.

Note 5: Financial Assets *(continued)*

	2010 $'000	2009 $'000
NOTE 5D: INVESTMENTS ACCOUNTED FOR USING THE EQUITY METHOD		
Investments in associates:		
Novozymes Biologicals Australia Pty Ltd	**257**	—
HRZ Wheats Pty Ltd	**287**	288
Total equity accounted investments	**544**	288
All such investments are expected to be recovered in more than 12 months.		
Summarised financial information of associates:		
Statement of Financial Position		
Assets	**1,564**	1,100
Liabilities	**338**	436
Net assets	**1,226**	664
Statement of comprehensive income		
Income	**735**	663
Expenses	**2,191**	2,460
Net (deficit)	**(1,456)**	(1,797)
Share of associates' net (deficit)		
Share of net (deficit) before tax	**(598)**	(672)
Income tax expense	**—**	—
Share of associates' net deficit) after tax	**(598)**	(672)

Details of investments accounted for using the equity method

Name of entity	Principal activities	Reporting date	Ownership 2010 %	Ownership 2009 %
Novozymes Biologicals Australia Pty Ltd*	Soil inoculant research and development	30 September	**50.0**	50.0
HRZ Wheats Pty Ltd*	Wheat breeding and commercialisation	30 June	**40.3**	43.4

* Incorporated in Australia

Note 5: Financial Assets *(continued)*

	2010 $'000	2009 $'000
NOTE 5E: INVESTMENTS—OTHER		
Shares in unlisted companies		
Australian Grain Technologies Pty Ltd	**11,386**	10,293
Provision for diminution in share value	**(7,171)**	(5,650)
	4,215	4,643
Australian Centre for Plant Functional Genomics Pty Ltd	**21**	21
Arista Cereal Technologies Pty Ltd	**3,200**	2,600
Provision for diminution in share value	**(1,752)**	(1,207)
	1,448	1,393
InterGrain Pty Ltd	**7,200**	4,500
Provision for diminution in share value	**(5,392)**	(3,534)
	1,808	966
Canola Breeders Western Australia Pty Ltd	**800**	400
Provision for diminution in share value	**(390)**	(97)
	410	303
Total investments—other	**7,902**	7,326

The shares held are ordinary shares.

All such investments are expected to be recovered in more than 12 months.

NOTE 5F: INVESTMENTS IN CONTROLLED ENTITIES

Name of entity	Country of incorporation	Amount of investment		% equity held	
		2010 $'000	2009 $'000	2010 %	2009 %
Single Vision Grains Australia Limited	Australia	**—**	—	**100.0**	100.0

Note 6: Non-Financial Assets

	2010 $'000	2009 $'000
NOTE 6A: LAND AND BUILDINGS		
Leasehold land—fair value	**1,000**	1,000
Total land	**1,000**	1,000
Buildings on leasehold land—fair value	**4,890**	4,890
Accumulated depreciation	**(196)**	—
Total buildings	**4,694**	4,890
Total land and buildings	**5,694**	5,890

Note 6: Non-Financial Assets *(continued)*

	2010 $'000	2009 $'000
NOTE 6B: INFRASTRUCTURE, PLANT AND EQUIPMENT		
Plant and equipment—fair value	**467**	395
Accumulated depreciation	**(155)**	(71)
Total infrastructure, plant and equipment	**312**	324
Movement in asset revaluation reserve		
Increment for land	**—**	50
Increment for buildings	**—**	474
Increment for plant and equipment	**—**	—
Total movement in asset revaluation reserve	**—**	524

No revaluation decrements were expensed during the year (2009: $NIL).

All revaluations are conducted in accordance with the revaluation policy stated at Note 1. An independent valuer, the Australian Valuation Office, conducted a formal revaluation of land and buildings as at 30 June 2009.

A formal revaluation of plant and equipment was conducted by the Australian Valuation Office as at 30 June 2008. It has been assessed that the carrying amount of plant and equipment does not materially differ from fair value at 30 June 2010.

No indicators of impairment were found for property, plant and equipment.

No property, plant or equipment is expected to be sold or disposed of within the next 12 months.

	2010 $'000	2009 $'000
NOTE 6C: INTANGIBLES		
Information Management System—at cost	**696**	696
Accumulated amortisation	**(688)**	(670)
Total Information Management System	**8**	26
Software—at cost	**399**	381
Accumulated amortisation	**(218)**	(145)
Total software	**181**	236
Intellectual property—at cost	**70**	63
Accumulated amortisation	**—**	—
Total intellectual property	**70**	63
Total intangibles	**259**	325

No indicators of impairment were found for intangible assets.

No intangibles are expected to be sold or disposed of within the next 12 months.

Note 6: Non-Financial Assets *(continued)*

NOTE 6D: ANALYSIS OF PROPERTY, PLANT, EQUIPMENT AND INTANGIBLES

Table A—Reconciliation of the opening and closing balances of property, plant and equipment (2009–10)

	Leasehold Land $'000	Buildings on leasehold land $'000	Other Infrastructure, Plant & Equipment $'000	Total $'000
As at 1 July 2009				
Gross book value	1,000	4,890	395	6,285
Accumulated depreciation and impairment	—	—	(71)	(71)
Net book value 1 July 2009	1,000	4,890	324	6,214
Additions:				
by purchase	—	—	78	78
Revaluations and impairment recognised in other comprehensive income	—	—	—	—
Depreciation expense	—	(196)	(90)	(286)
Disposals:				
other disposals	—	—	—	—
Net book value 30 June 2010	1,000	4,694	312	6,006
Net book value as at 30 June 2010 represented by:				
Gross book value	1,000	4,890	467	6,357
Accumulated depreciation and impairment losses	—	(196)	(155)	(351)

Table B—Reconciliation of the opening and closing balances of property, plant and equipment (2008–09)

	Leasehold Land $'000	Buildings on leasehold land $'000	Other Infrastructure, Plant & Equipment $'000	Total $'000
As at 1 July 2008				
Gross book value	950	4,800	241	5,991
Accumulated depreciation and impairment	—	(192)	—	(192)
Net book value 1 July 2008	**950**	**4,608**	**241**	**5,799**
Additions:				
by purchase	—	—	154	154
Revaluations and impairment recognised in other comprehensive income	50	474	—	524
Depreciation expense	—	(192)	(71)	(263)
Disposals:				
other disposals	—	—	—	—
Net book value 30 June 2009	**1,000**	**4,890**	**324**	**6,214**
Net book value as at 30 June 2009 represented by:				
Gross book value	**1,000**	**4,890**	**395**	**6,285**
Accumulated depreciation and impairment losses	**—**	**—**	**(71)**	**(71)**

Note 6: Non-Financial Assets *(continued)*

NOTE 6D: ANALYSIS OF PROPERTY, PLANT, EQUIPMENT AND INTANGIBLES *(continued)*

Table C—Reconciliation of the opening and closing balances of intangibles (2009–10)

	Information Management System $'000	Software $'000	Intellectual Property $'000	Total $'000
As at 1 July 2009				
Gross book value	696	381	63	1,140
Accumulated amortisation and impairment	(670)	(145)	—	(815)
Net book value 1 July 2009	26	236	63	325
Additions:				
by purchase	—	18	7	25
Amortisation expense	(18)	(73)	—	(91)
Net book value 30 June 2010	8	181	70	259
Net book value as at 30 June 2010 represented by:				
Gross book value	696	399	70	1,165
Accumulated amortisation and impairment	(688)	(218)	—	(906)

Table D—Reconciliation of the opening and closing balances of intangibles (2008–09)

	Information Management System $'000	Software $'000	Intellectual Property $'000	Total $'000
As at 1 July 2008				
Gross book value	691	233	—	924
Accumulated amortisation and impairment	(570)	(97)	—	(667)
Net book value 1 July 2008	**121**	**136**	**—**	**257**
Additions:				
by purchase	5	148	63	216
Amortisation expense	(100)	(48)	—	(148)
Net book value 30 June 2009	**26**	**236**	**63**	**325**
Net book value as at 30 June 2009 represented by:				
Gross book value	**696**	**381**	**63**	**1,140**
Accumulated amortisation and impairment	**(670)**	**(145)**	**—**	**(815)**

Note 6: Non-Financial Assets *(continued)*

	2010 $'000	2009 $'000
NOTE 6E: OTHER NON-FINANCIAL ASSETS		
Accrued interest	127	95
Accrued income	774	960
Prepayments	17	24
Total other non-financial assets	918	1,079

No indicators of impairment were found for other non-financial assets.

Accrued interest

The interest rates range from 3.87% to 4.50% (2009: 2.25% to 3.00%) and the frequency of payments is monthly.

Note 7: Provisions

	2010 $'000	2009 $'000
NOTE 7A: EMPLOYEE PROVISIONS		
Leave	1,233	1,036
Total employee provisions	1,233	1,036
Employee provisions are expected to be settled in:		
No more than 12 months	1,075	834
More than 12 months	158	202
Total employee provisions	1,233	1,036

Note 8: Payables

	2010 $'000	2009 $'000
NOTE 8A: SUPPLIERS		
Trade creditors—external parties	279	224
Accrued expenses—external parties	1,735	517
Total supplier payables	2,014	741

All supplier payables are expected to be settled within 12 months.

Settlement is usually made net 30 days.

NOTE 8B: RESEARCH AND DEVELOPMENT		
Research and development	44,924	38,628
Research and development payables are expected to be settled in:		
No more than 12 months	44,506	37,189
More than 12 months	418	1,439
Total research and development payables	44,924	38,628

Note 9: Cash Flow Reconciliation

		2010 $'000	2009 $'000
NOTE 9(a): RECONCILIATION OF CASH AND CASH EQUIVALENTS AS PER BALANCE SHEET TO CASH FLOW STATEMENT			
Cash and cash equivalents as per:			
Cash Flow Statement		**33,905**	33,104
Balance Sheet	5A	**33,905**	33,104
Difference		**—**	—
NOTE 9(b): RECONCILIATION OF NET COST OF SERVICES TO NET CASH FROM OPERATING ACTIVITIES			
Net cost of services		**(39,625)**	(14,752)
Add revenue from Government		**50,071**	43,896
Add share of (deficit) of associates		**(598)**	(672)
Adjustments for non-cash items			
Depreciation/amortisation		**377**	411
Net write down of financial assets		**4,217**	3,311
Share of net loss of associates		**598**	672
Revaluation of investments		**(618)**	(2,610)
Changes in assets/liabilities			
(Increase)/decrease in receivables		**9,344**	(9,351)
(Increase)/decrease in prepayments		**7**	(23)
Increase in employee provisions		**197**	82
Increase in payables		**7,568**	12,526
Net cash from operating activities		**31,538**	33,490

Note 10: Directors' Remuneration

	2010	2009
The number of directors of the Corporation included in these figures are shown below in the relevant remuneration bands:		
$ Nil—$14,999	**—**	3
$15,000—$29,999	**—**	5
$30,000—$44,999	**5**	2
$45,000—$59,999	**1**	—
$60,000—$74,999	**1**	1
$570,000—$584,999	**1**	1
Total	**8**	12
Total remuneration received or due and receivable by directors of the Corporation	**858,286**	842,107

The directors of the Corporation, with the exception of the Managing Director, are appointed by the Minister—Agriculture, Fisheries and Forestry, Australia.

Note 11: Related Party Disclosures

The following persons were Directors of the Grains Research and Development Corporation during the year:

Mr Keith Perrett (Chairman)
Ms Nicole Birrell
Mr Steve Marshall (Deputy Chairman)
Prof. Timothy Reeves
Ms Jennifer Goddard
Mr Colin Butcher
Prof. Graeme Robertson
Mr Peter 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 10.

Note 12: Executive Remuneration

Executive remuneration includes all senior managers concerned in making decisions that affect the whole, or a substantial part, of the operations of the Corporation during 2009–10 except the Managing Director. Details in relation to the Managing Director have been incorporated in Note 10—Directors' Remuneration.

NOTE 12A: ACTUAL REMUNERATION PAID TO SENIOR EXECUTIVES

The number of Senior Executives of the Corporation included in these figures are shown below in the relevant remuneration bands:

	2010	2009
Less than $145,000*	—	—
Between $145,000—$159,999	—	—
Between $160,000—$174,999	—	—
Between $190,000—$204,999	2	—
Between $205,000—$219,999	1	—
Between $220,000—$234,999	3	1
Between $235,000—$249,999	—	2
Total	6	3

* Excluding acting arrangements and part-year service

For the purpose of this note disclosure remuneration includes:
(a) Salary
(b) Movement in annual leave and long service leave provisions
(c) Superannuation (post-employment benefits)
(d) Reportable fringe benefits

Note 12: Executive Remuneration *(continued)*

NOTE 12A: ACTUAL REMUNERATION PAID TO SENIOR EXECUTIVES *(continued)*

Total expense recognised in relation to Senior Executive employment

	2010 $	2009 $
Short-term employee benefits:		
Salary (including annual leave taken)	1,083,050	528,755
Changes in short-term leave provisions	17,614	23,993
Total Short-term employee benefits	1,100,664	552,748
Superannuation (post-employment benefits)	175,812	157,107
Other long-term benefits	13,741	4,694
Total	1,290,217	714,549

During the year no termination benefits were paid to senior executives (2009: $NIL).

NOTE 12B: SALARY PACKAGES OF SENIOR EXECUTIVES

Average annualised remuneration packages for substantive Senior Executives employed at 30 June

	As at 30 June 2010			As at 30 June 2009		
Total remuneration	No. Senior Executives	Base Salary (including annual leave)	Total Remuneration package[1]	No. Senior Executives	Base Salary (including annual leave)	Total Remuneration package[1]
		$	$		$	$
Less than $145,000	—	—	—	—	—	—
$145,000 to $159,999	—	—	—	—	—	—
$160,000 to $174,999	—	—	—	—	—	—
$175,000 to $189,999	1	149,541	187,450	2	148,165	185,725
$190,000 to $204,999	1	155,963	195,500	—	—	—
$205,000 to $219,999	1	175,229	219,650	1	169,725	212,750
$220,000 to $234,999	2	184,862	231,725	3	181,040	226,933
$235,000 to $249,999	1	189,908	238,050	—	—	—
	6			6		

Notes
1. Non-Salary elements available to Senior Executives include:
(a) Performance bonus
(b) Superannuation

Note 13: Remuneration of Auditors

The cost of financial statement audit services, including the Single Vision Grains Australia Limited audit fee of $1,100, provided to the Corporation was:

	2010 $'000	2009 $'000
Australian National Audit Office	24,100	22,700

Note 14: Financial Instruments

	2010 $'000	2009 $'000
NOTE 14A: CATEGORIES OF FINANCIAL INSTRUMENTS		
Financial assets		
Loans and receivables:		
Cash and cash equivalents	**33,905**	33,104
Trade and other receivables	**6,855**	17,325
Total	**40,760**	50,429
Available-for-sale:		
Shares in unlisted companies	**7,902**	7,326
Total	**7,902**	7,326
Fair value through profit or loss (designated):		
Managed funds	**115,412**	89,806
Total	**115,412**	89,806
Carrying amount of financial assets	**164,074**	147,561
Financial liabilities		
At amortised cost		
Payables	**45,203**	38,852
Total	**45,203**	38,852
Carrying amount of financial liabilities	**45,203**	38,852
NOTE 14B: NET INCOME AND EXPENSE FROM FINANCIAL ASSETS		
Loans and receivables		
Interest revenue (note 4A)	**1,409**	1,456
Net gain from loans and receivables	**1,409**	1,456
Available-for-sale		
Impairment (note 3E)	**(4,217)**	(3,311)
Net (loss) from available-for-sale	**(4,217)**	(3,311)
Fair value through profit or loss (designated)		
Interest revenue (note 4A)	**5,606**	8,554
Net gain from fair value through profit and loss	**5,606**	8,554
Net gain from financial assets	**2,798**	6,699

NOTE 14C: FAIR VALUE OF FINANCIAL INSTRUMENTS

The carrying amount of all financial assets and financial liabilities approximate their fair value.

Fair value measurements categorised by fair value hierarchy

The following table provides an analysis of financial instruments that are measured subsequent to initial recognition at fair value, grouped into Levels 1 to 3 based on the degree to which the fair value is observable.

Level 1 fair value measurements are those derived from quoted prices (unadjusted) in active markets for identical assets or liabilities.

Note 14: Financial Instruments *(continued)*

NOTE 14C: FAIR VALUE OF FINANCIAL INSTRUMENTS *(continued)*

Level 2 fair value measurements are those derived from inputs other than quoted prices included in Level 1 that are observable for the asset or liability either directly (that is, as prices) or indirectly (that is, derived from prices).

Level 3 fair value measurements are those derived from valuation techniques that include inputs for the asset or liability that are not based on observable market data.

	Level 1	Level 1	**Level 2**	Level 2	**Level 3**	Level 3
	2010	2009	**2010**	2009	**2010**	2009
	$'000	$'000	**$'000**	$'000	**$'000**	$'000
Financial assets at fair value						
Fair value through profit or loss	**115,412**	89,806	**—**	—	**—**	—
	115,412	89,806	**—**	—	**—**	—

There were no transfers between Level 1 and 2 in the period.

NOTE 14D: CREDIT RISK

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.

Fair value through profit or loss investments are restricted to securities that are in accordance with paragraphs 18(a)—(d) of the CAC Act, including, as a minimum, a Standard and Poor's long-term rating of A–. Further restrictions are imposed under the policies and procedures of the Corporation. The majority of loans and receivables are cash and levies from industry.

The Corporation manages its credit risk through:

- A monthly review by management of the Corporation's investments:
  - to ensure that they are in accordance with section 18 of the CAC Act and the Corporation's policies and procedures; and
  - to assess how the investments are performing against various benchmarks (including the Cash Rate, the 90 Day Bank Bill Index and the UBS Government Bond Index 0–5 years);
- A biannual review by the Finance, Risk and Audit Committee of the performance of the Corporation's individually managed funds in comparison with other managed funds investing in the Australian Bond and Australian Cash sectors; and
- Policies and procedures that guide employees in managing debtors.

The Corporation holds no collateral to mitigate against credit risk.

Credit quality of financial instruments not past due or individually determined as impaired

	Not past due nor impaired	Not past due nor impaired	**Past due or impaired**	Past due or impaired
	2010	2009	**2010**	2009
	$'000	$'000	**$'000**	$'000
Cash and cash equivalents	**33,905**	33,104	**—**	—
Receivables	**6,769**	17,325	**86**	—
Managed funds	**115,412**	89,806	**—**	—
Shares in unlisted companies	**21**	21	**7,881**	7,305
	156,107	140,256	**7,967**	7,305

Note 14: Financial Instruments *(continued)*

NOTE 14D: CREDIT RISK *(continued)*

Ageing of financial assets that are past due but not impaired for 2010

	0 to 30 days	31 to 60 days	61 to 90 days	90+ days	Total
	$'000	$'000	$'000	$'000	$'000
Receivables	43	—	18	25	86
	43	—	18	25	86

Ageing of financial assets that are past due but not impaired for 2009

	0 to 30 days	31 to 60 days	61 to 90 days	90+ days	Total
	$'000	$'000	$'000	$'000	$'000
Receivables	—	—	—	—	—
	—	—	—	—	—

The following assets have been individually assessed as impaired

	2010	2009
	$'000	$'000
Shares in unlisted companies	7,881	7,305

Factors that have been considered in assessing the shares as impaired include:

- the continued uncertainty in the success and ability of the companies to generate future economic benefits; and
- the decrease in the net assets of the companies.

NOTE 14E: LIQUIDITY RISK

The exposure to liquidity risk is based on the notion that the Corporation will encounter difficulty in meeting its obligations associated with financial liabilities.

The Corporation has minimal exposure to liquidity risk. The Corporation receives funding from industry through levies and contributions from the Australian Government. In addition, the Corporation has controls in place to ensure that it has adequate resources to meet its financial obligations and has no experience of default.

Maturities for non-derivative financial liabilities 2010

	On demand	Within 1 year	1 to 2 years	2 to 5 years	> 5 years	Total
	$'000	$'000	$'000	$'000	$'000	$'000
Payables	—	44,785	418	—	—	45,203
	—	44,785	418	—	—	45,203

Maturities for non-derivative financial liabilities 2009

	On demand	Within 1 year	1 to 2 years	2 to 5 years	> 5 years	Total
	$'000	$'000	$'000	$'000	$'000	$'000
Payables	—	37,413	1,250	189	—	38,852
	—	37,413	1,250	189	—	38,852

The Corporation has no derivative financial liabilities in both the current and prior year.

Note 14: Financial Instruments *(continued)*

NOTE 14F: MARKET RISK

Interest rate risk

Interest rate risk refers to the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market interest rates. The Corporation is exposed to interest rate risk primarily from managed funds.

The table below details the interest rate sensitivity analysis of the Corporation at the reporting date, holding all other variables constant. A 75 basis point change is deemed to be a possible change and is used when reporting interest rate risk.

	Risk variable	Change in risk variable	Effect on		Effect on	
			Profit or loss	**Equity**	Profit or loss	Equity
			2010 $'000	**2010 $'000**	2009 $'000	2009 $'000
Interest rate risk	Interest	+0.75%	**1,710**	**1,710**	1.259	1.259
		–0.75%	**(1,711)**	**(1,711)**	(1,259)	(1,259)

The method used to arrive at the possible change of 75 basis points was based on both statistical and non-statistical analysis. The statistical analysis has been based on the cash rate for the past five years issued by the Reserve Bank of Australia (RBA) as the underlying dataset. This information is then revised and adjusted for reasonableness under the current economic circumstances.

75 basis points is considered reasonable because it is reasonably possible that there will be greater volatility compared to that which has been experienced in recent years, however, not to the extent of the extraordinary volatility experienced in 2009–10.

Currency risk

Foreign currency risk refers to the risk that the fair value or future cash flows of a financial instrument will fluctuate due to changes in foreign exchange rates. The Corporation is exposed to foreign exchange currency risk primarily through undertaking certain transactions denominated in foreign currency.

The Corporation is exposed to foreign currency denominated in US dollars and Canadian dollars.

The following table details the effect on the profit and equity as at 30 June from a 12 per cent favourable/unfavourable change in AUS dollars against US dollars and Canadian dollars with all other variables held constant.

	Risk variable	Change in risk variable	Effect on		Effect on	
			Profit or loss	**Equity**	Profit or loss	Equity
			2010 $'000	**2010 $'000**	2009 $'000	2009 $'000
Currency risk	USD	+12%	**88**	**88**	231	231
		– 12%	**(113)**	**(113)**	(294)	(294)
Currency risk	CAD	+12%	**1**	**1**	—	—
		– 12%	**(1)**	**(1)**	—	—

Note 14: Financial Instruments *(continued)*

NOTE 14F: MARKET RISK *(continued)*

Currency risk (continued)

The method used to arrive at the possible risk of 12 per cent was based on both statistical and non-statistical analyses. The statistical analysis has been based on main currencies movement for the last five years. The five main currencies that the Commonwealth is exposed to are USD, EUR, GBP, JPY and NZD. This information is then revised and adjusted for reasonableness under the current economic circumstances.

A standard rate of 12 per cent is considered reasonable because it is reasonably possible that there will be greater volatility compared to that which has been experienced in recent years, however, not to the extent of the extraordinary volatility experienced in 2009–10.

Other price risk

The Corporation is not exposed to other price risk.

Note 15: Compensation and Debt Relief

No compensation or debt relief payments were made during the reporting period (2009: $NIL).

Note 16: Reporting of Outcomes

Corporation activity involves the identification, co-ordination, funding and evaluation of research and development for the Australian grains industry. The financial statements provide a detailed overview of the Corporation's total financial operations for the year ended 30 June 2010. The Corporation operates predominantly in one industry, the grains industry and in one geographical area, being Australia.

NOTE 16A: NET COST OF OUTCOME DELIVERY

	Outcome 1		Total	
	2010	2009	**2010**	2009
	$'000	$'000	**$'000**	$'000
Expenses				
Departmental	**133,370**	121,272	**133,370**	121,272
Total	**133,370**	121,272	**133,370**	121,272
Other own-sourced income				
Departmental				
Interest	**7,015**	10,010	**7,015**	10,010
Industry contributions	**74,065**	89,207	**74,065**	89,207
Project refunds	**784**	2,207	**784**	2,207
Royalties	**2,412**	2,003	**2,412**	2,003
Grants income	**8,924**	2,632	**8,924**	2,632
Other revenue	**541**	430	**541**	430
Sale of assets	**4**	31	**4**	31
Total other own-sourced income	**93,745**	106,520	**93,745**	106,520
Net cost/(contribution) of outcome delivery	**39,625**	14,752	**39,625**	14,752

Outcome 1 is described at Note 1.1.

Note 16: Reporting of Outcomes *(continued)*

NOTE 16B: MAJOR CLASSES OF DEPARTMENTAL EXPENSES, INCOME, ASSETS AND LIABILITIES BY OUTCOMES

	Outcome 1		Total	
	2010 $'000	2009 $'000	2010 $'000	2009 $'000
Expenses				
Research and development	116,751	106,252	116,751	106,252
Employees	6,453	6,104	6,453	6,104
Suppliers	5,572	5,194	5,572	5,194
Depreciation and amortisation	377	411	377	411
Write-down of assets	4,217	3,311	4,217	3,311
Total expenses	133,370	121,272	133,370	121,272
Income				
Revenues from Government	50,071	43,896	50,071	43,896
Interest	7,015	10,010	7,015	10,010
Industry contributions	74,065	89,207	74,065	89,207
Project Refunds	784	2,207	784	2,207
Royalties	2,412	2,003	2,412	2,003
Grants	8,924	2,632	8,924	2,632
Other revenue	541	430	541	430
Gain on sale of assets	4	31	4	31
Total income	143,816	150,416	143,816	150,416
Assets				
Cash and cash equivalents	33,905	33,104	33,905	33,104
Trade and other receivables	12,664	22,008	12,664	22,008
Investments	115,412	89,806	115,412	89,806
Investments accounted for using the equity method	544	288	544	288
Investments—other	7,902	7,326	7,902	7,326
Land and buildings	5,694	5,890	5,694	5,890
Infrastructure, plant and equipment	312	324	312	324
Intangibles	259	325	259	325
Other non financial assets	17	24	17	24
Total assets	176,709	159,095	176,709	159,095
Liabilities				
Employee provisions	1,233	1,036	1,233	1,036
Suppliers payables	2,014	741	2,014	741
Research and development payables	44,924	38,628	44,924	38,628
Total liabilities	48,171	40,405	48,171	40,405

Outcome 1 is described at Note 1.1.

Appendices

Western Australian grain grower Ian Stanley. *Photo: Evan Collis*

Appendix A: Expenditure on government research priorities

The following tables summarise the total expenditure allocated against the Australian Government's National Research Priorities and priorities for rural R&D within the 2009–10 financial year (see Table 12 in Part 2 for a summary of how GRDC investments addressed theses priorities). The allocation of funds is shown in both dollar and percentage terms for each output group.

TABLE 28a: Australian Government National Research Priorities, dollar values ($m)

	An Environmentally Sustainable Australia							Promoting and Maintaining Good Health				Frontier Technologies for Building and Transforming Australian Industries					Safeguarding Australia				Other	Total
	A1	A2	A3	A4	A5	A6	A7	B1	B2	B3	B4	C1	C2	C3	C4	C5	D1	D2	D3	D4		
Practices	7.94	7.91	2.97				7.21			0.12			0.20			9.85			10.68		2.11	**48.99**
Varieties	0.21		0.35				2.80						27.96			5.37			6.75		2.09	**45.53**
New Products			0.04				1.21			1.53			3.27	2.04	0.01	0.06			4.68		1.00	**13.84**
CCB																5.80						**5.80**
CSIA													0.06			2.47					0.06	**2.59**
Total	**8.15**	**7.91**	**3.36**				**11.22**			**1.65**			**31.49**	**2.04**	**0.01**	**23.55**			**22.11**		**5.26**	**116.75**

CCB = Communication & Capacity Building, CSIA = Corporate Strategy & Impact Assessment

TABLE 28b:

Australian Government National Research Priorities, percentage values (%)

	An Environmentally Sustainable Australia							Promoting and Maintaining Good Health				Frontier Technologies for Building and Transforming Australian Industries					Safeguarding Australia				Other	Total
	A1	A2	A3	A4	A5	A6	A7	B1	B2	B3	B4	C1	C2	C3	C4	C5	D1	D2	D3	D4		
Practices	6.80	6.78	2.54				6.18			0.10			0.17			8.43			9.15		1.81	**41.96**
Varieties	0.18		0.29				2.40						23.95			4.59			5.78		1.80	**38.99**
New Products			0.04				1.04			1.31			2.80	1.74	0.01	0.05			4.01		0.86	**11.86**
CCB																4.97						**4.97**
CSIA													0.05			2.12					0.05	**2.22**
Total	**6.98**	**6.78**	**2.87**				**9.62**			**1.41**			**26.97**	**1.74**	**0.01**	**20.16**			**18.94**		**4.52**	**100.00**

CCB = Communication & Capacity Building, CSIA = Corporate Strategy & Impact Assessment

TABLE 29:

Australian Government Rural R&D Priorities, dollar and percentage values

	Productivity and Adding Value		Supply Chain and Markets		Natural Resource Management		Climate Variability and Climate Change		Biosecurity		Innovation Skills		Technology		Other		Total	
	$m	%	$m	%	$m	%	$m	%	$m	%	$m	%	$m	%	$m	%	$m	%
Practices	9.92	8.49	2.11	1.81	9.02	7.73	7.21	6.17	10.26	8.79	10.27	8.80	0.20	0.17			**48.99**	**41.96**
Varieties	17.57	15.05	2.04	1.74	0.35	0.30	3.01	2.58	6.75	5.78	5.37	4.59	10.39	8.90	0.05	0.05	**45.53**	**38.99**
New Products	1.46	1.25	1.22	1.05	0.04	0.03	1.21	1.04	4.68	4.01	0.06	0.05	5.11	4.38	0.06	0.05	**13.84**	**11.86**
CCB											5.80	4.97					**5.80**	**4.97**
CSIA	0.06	0.05									2.47	2.12			0.06	0.05	**2.59**	**2.22**
Total	**29.01**	**24.84**	**5.37**	**4.60**	**9.41**	**8.06**	**11.43**	**9.79**	**21.69**	**18.58**	**23.97**	**20.53**	**15.70**	**13.45**	**0.17**	**0.15**	**116.75**	**100.00**

CCB = Communication & Capacity Building, CSIA = Corporate Strategy & Impact Assessment

Appendix B: GRDC project list

Number	Title	Expenditure $
	PRACTICES	
	Agronomy, Soils and Environment	
BWD00019	Australian farm groups demonstrating adaptive practices to minimise the impact of climate change on farm viability	1,112,000
CCC00004	High Yielding Irrigated Grains in Cotton Farming Systems, Phase 3	229,881
CSA00016	Putting precision agriculture on the ground in WA	250,000
CSA00019	Soil Carbon Research Program	680,000
CSA00022	Developing climate change resilient cropping and mixed cropping–grazing businesses in Australia	100,000
CSA00024	More good, less bad and ugly—extracting additional value from grain production through selective harvesting	224,970
CSE00051	Pest suppressive landscapes—linking integrated pest management and natural resource management	508,219
CSP00110	Water balance of conservation farming systems in SA and NSW	78,799
CSP00115	Improving productivity by rotating wheat varieties in wheat-on-wheat systems	134,128
CSP00127	Water balance of conservation farming systems in WA 2	71,272
CSP00132	Optimising the integration of dual-purpose crops in the high-rainfall zone	256,634
CSP00134	Biodiversity management in the high-rainfall zone for conservation and provision of ecosystem services	104,283
CSP00135	A molecular approach to unravel the dynamics of disease-suppressive microbial communities	35,000
CSP00136	A national research project for climate-ready crops	116,000
CSPS20	Project Review—WANTFA projects	8,662
DAF00003-3	National Adaptation and Mitigation Initiative coordination project	79,351
DAN00119	*Brassica juncea* agronomy	150,000
DAN00131	Developing agronomic solutions to improve barley yield and grain quality in the Northern Region	165,112
DAN00132	Making better fertiliser decisions for cropping systems in Australia	355,187
DAN00138	Barley agronomy for the Southern Region 2010–2013	394,877
DAQ00123	Agronomic packages for improved yield and quality in the Australian peanut industry	196,602
DAQ00148	Defining critical soil nutrient concentrations in soils supporting grains and cotton in northern NSW and Queensland	127,217
DAQ00163	Participatory adaptation and mitigation strategies for climate change on the mixed farms of north-eastern Australia	358,741
DAS00088	Advancing site-specific management of weeds and soil-borne diseases	169,936
DAS00111	DNA tests for nematode community analysis	72,320
DAV00083	Assisting growers achieve yield potential in the high-rainfall zones of south-eastern Australia	375,039
DAV00084	New Varieties, New Agronomy—Pulse agronomic research, south-eastern Australia	250,000
DAV00090	Real-time sensing of crops for management intervention—application of thermal and hyperspectral technologies	149,990
DAV00096	Decreasing nitrous oxide emissions in high-rainfall cropping systems	333,000
DAV00097	The potential of inhibitors for the mitigation of nitrous oxide emissions from animal production systems, in south-eastern Australia	270,000
DAV00099	Harnessing the biological potential of Australian cropping soils	126,778
DAV00102	Monitoring soil biology with high resolution genomic technologies	79,562

Number	Title	Expenditure $
DAV00105	Suppressive soils—Can we find a microbial finger-print using 'omics' technology?	104,732
DAV00106	Managing soil biology to improve nitrogen supply in grain production systems	100,000
DAV00108	Demonstrating climate change mitigation and adaptation options through linked and integrated cropping farms in Victoria	73,307
DAV00109	Wheat-pulse dynamics under elevated carbon dioxide	300,000
DAW00146	Enhancing paddock productivity—A collaborative, diagnostic approach to cropping systems research	547,288
DAW00147	Variety-specific agronomy for wheat yield and quality in the Western Region	301,328
DAW00161	Increasing the profitability of cropping systems in WA using lupins, oats, oilseeds and pulses	750,000
DAW00190	Barley agronomy for the Western Region—2009 to 2012	425,000
DHI00001	Rainfall-radar for improving agricultural profitability and sustainability	32,150
DNR00008	Advanced techniques for managing subsoil constraints	199,990
ERM00001	Reducing nitrous oxide emissions from sugarcane lands	242,500
FFI00003	EverCrop™ and EverCrop Decide: developing the role for perennials in mixed farming systems	554,354
FFI00004	Development of a salt- and waterlogging-tolerant wheat	195,646
HAL00001	Managing Climate Variability—critical thresholds—income	(20,000)
HAL00002	Managing Climate Variability—critical thresholds—Horticulture Australia	34,782
HAL00003	Managing Climate Variability—critical thresholds—Horticulture Australia	60,000
LIE00007	Increasing water use efficiency and decreasing input costs for sustainable and profitable farms in a changing climate	75,000
LWR00007	Contribution to National Program for Sustainable Irrigation	190,000
MCV00002	Improving seasonal forecasts for south-western WA	220,000
MCV00004	Climate change and variability—assessing regional impacts of sugar cane production	25,000
MCV00005	Extremes, climate modes and reanalysis	125,000
MCV00006	Assessing and managing heat stress in cereals	60,000
MCV00007	Teleconnections between climate drivers and regional climate, and model representation of links	233,331
MCV00008	Improving forecast accuracy, especially with improved Indian Ocean initialisation	192,700
MCV00009	Improving multi-week predictions	182,800
MCV00010	Understanding frost risk in a variable and changing climate	135,810
MCV00011	Completing climate drivers and synoptic features	22,000
MCV00012	Multi-week climate outlook products for Australia	150,000
MCV00013	Temperature extremes and cropping in WA	30,794
MCV00014	Managing Climate Variability—communication support	337,238
MCV00015	Managing Climate Variability—program coordinator	152,672
MCV00018	Managing Climate Variability—website	375
MCV00019	Managing Climate Variability—communication products	9,592
MCV00022	Managing Climate Variability—program officer	60,825
MCV00023	Managing Climate Variability—program management committee	1,438
MCV00024	Managing Climate Variability—independent chair	9,145
MCV00026	Managing Climate Variability—Landcare Australia funds	20,000
MCV00027	Managing Climate Variability—monitoring and evaluation: planned projects	5,502
PR108-1	Think Tank Workshop	41,259
PR161-1	Making better fertiliser decisions in Australian cropping systems	2,600
QUT00002	Integrated data and synthesis framework for reducing nitrous oxide emissions from Australian agricultural soils	595,629

Number	Title	Expenditure $
QUT00003	Reducing nitrous oxide emissions in irrigated grains–cotton farming systems	85,842
SAI00001	Water footprint—pilot project	3,077
SAI00002	SAI Platform—annual membership fee	8,000
SAN00018	Water-jet in agriculture, Phase 1	51,000
UA00091	Responses to salinity in barley and pulse crops	28,800
UA00103	DGT (diffusive gradients in thin films) as the soil test of choice for predicting phosphorus requirements of grain crops	150,000
UA00111	Developing chemical methods to mobilise fixed nutrients in cropping soils	150,000
ULA00008	Validating subsoil manuring in the high-rainfall zone	141,578
UM00037	Enhanced efficiency fertilisers as mitigation tools for reducing greenhouse gas emissions from intensive agricultural systems in Australia	136,173
UMU00030	Making better fertiliser decisions in the WA cropping systems	107,313
UNE00012	Mitigating nitrous oxide emissions from soils using pulses and improved nitrogen management	150,000
UNE00014	Nitrogen and legumes in farming systems: compendium and Excel-based package for improved nitrogen management	80,017
US00044	Next steps in precision agriculture	179,170
USA00005	Improving sowing system technologies for no-till cropping	86,000
UWA00114	Capacity building in production agronomy and farming systems (teaching, research and postgraduate training) at UWA	50,048
UWA00131	Fertiliser management strategies for decreasing on-farm greenhouse gas emissions	345,275
UWA00136	Long term no-till farming systems	349,869
UWA00138	A national soil quality monitoring framework	415,000
UWA00139	Harnessing the nitrogen cycle through novel solutions	152,298
	Total Agronomy, Soils and Environment	***17,012,807***
	Crop Protection	
AKC00002	Registration of minor use chemistry for the grains industry	125,000
AKC00003	Pathways to registration—Improved pesticide research coordination in the grains industry	144,740
AKC00004	Registration for minor use chemicals for the grains industry	130,000
CER00002	Study on economic impacts of pulse and oilseed crop diseases in Australia	69,709
CSE00046	National Invertebrate Pest Initiative	421,791
CSE00048	Better prediction and management of *Rhizoctonia* disease risk in cereals	315,892
DAN00109	Management of *Fusarium* and other winter cereal diseases in the northern cropping zone	250,000
DAN00110	More profitable chickpeas through disease management and disease screening—Northern Region	90,000
DAN00111	Differential herbicide tolerance of winter crops in south-eastern Australia, Stage 3	157,331
DAN00115	Integrated disease control for broad leaf crops with varietal selection and crop management for southern NSW and northern Victoria	140,000
DAN00116	Integrated disease management in northern no-tillage systems using precision agriculture	115,107
DAN00121	Helicoverpa insecticide resistance: monitoring, mechanisms and management 2	106,447
DAQ00105	Continued delivery of applied solutions to weed issues in central Queensland	73,300
DAQ00130	Management of tobacco streak virus in sunflower and pulse crops	104,000
DAQ00136	Risk assessment and preventive strategies for herbicide resistance in the Northern Region, Phase 3	300,000
DAQ00137	Improved options for fleabane control in the Northern Region	175,000
DAQ00152	Herbicide tolerance screening of winter crops in the Northern Region, Phase 4	100,000
DAQ00153	Northern Region pulse and grains integrated pest management	250,000

Number	Title	Expenditure $
DAQ00154	Northern Region integrated disease management	598,958
DAS00094	Diamondback moth (*Plutella xylostella*) control and insecticide resistance management	247,276
DAS00095	Assessment of the biological control potential of *Sarcophaga penicillata*	99,287
DAS00099	Disease management in a changing farming environment	655,900
DAS00100	Herbicide tolerance screening in the Southern Region with national coordination	150,000
DAV00078	Victorian pulse pathology and virology support program	196,750
DAV00087	Victorian cereal pathology support with emphasis on crown rot management	273,310
DAW00157	Cultivars for rotational management of root lesion and burrowing nematodes in WA	175,000
DAW00158	Applied weed management in WA	183,500
DAW00159	Management to minimise disease constraints in Western Region farming systems	865,000
DAW00174	In-furrow fungicide options	160,000
DAW00177	Developing integrated pest management guidelines for the WA grain belt and strategies to manage the wheat curl mites' spread of wheat streak mosaic virus	248,700
DAW00191	Evaluating herbicide tolerance of new crop varieties in the Western Region with national coordination	177,500
DAW00196	Communication and development to deliver innovative weed management practices to WA grain growers	220,000
GRD205	National Invertebrate Pest Initiative/National Integrated Weed Management Initiative program logic workshop	577
GRD205-1	National Invertebrate Pest Initiative/National Integrated Weed Management Initiative program logic workshop	16,834
ICN00009	National promotion of integrated weed management in Australian cropping systems	139,900
KAL00002	Multiple cereal foliar fungicide treatments at different crop growth times in association with some Western Region National Variety Trials	79,200
LRP00001	Project review—Australian Centre for Necrotrophic Fungal Pathogens	4,000
NPB00005	National reference laboratory for *Trogoderma* and related dermestids	72,560
NPB00006	Development of biosecurity contingency plans and assessment of data for declaring freedom from emergency plant pests	115,542
NPB00008	Russian wheat aphid hypervirulence and Australia's preparedness strategy	109,539
NPB00010	Defining the plant pathogen incursion risk posed by international travellers	137,368
NPB00011	Scoping study for national surveillance of grains to manage biosecurity, food and feed safety market risks initiative	130,000
PMA00001	Project review—Australian Centre for Necrotrophic Fungal Pathogens	10,000
PR260-1	Project review—Western Australian Herbicide Resistance Initiative	35,383
PR261-1	Project review—Australian Centre for Necrotrophic Fungal Pathogens	36,919
REB00001	Project review—Western Australian Herbicide Resistance Initiative	12,296
RMC00001	Project review—Australian Centre for Necrotrophic Fungal Pathogens	4,000
SFS00017	Optimising cereal profitability in the high-rainfall zone through integration of disease management and canopy management principles	360,300
UA00098	Managing the risks of trifluralin resistance in no-till cropping systems	142,077
UA00104	Understanding and management of weed resistance to glyphosate	160,208
UA00105	Emerging weeds in changing farming systems	200,000
UA00113	Improving integrated weed management in conservation farming systems in the Southern Region	404,964
UM00030	Pilot scale implementation strategy to maximise durability of blackleg resistance in canola	102,826
UM00031	Monitoring virulence in Australian populations of the blackleg fungus	160,095
UM00033	Developing and demonstrating the role of alternative chemistries and integrated management for crop establishment pests	354,369

Number	Title	Expenditure $
UM00035	Impact assessment for GM canola in cropping systems	120,482
UM00038	Novel approaches to control fungal diseases of oilseed brassicas in Australia	299,995
UM00039	Understanding pathogenicity risk within the current *Ascochyta rabiei* fungal population and development of a revised disease management plan	83,250
UM00041	Wheat curl mite, wheat streak mosaic and high plains virus: detection, transmission, epidemiology and management	237,800
UMU00031	Fungicide resistance benchmarks	100,000
UQ00047	An interim model for buffer zone reduction in pesticide application from ground sprayers	100,000
UWA00112	Western Australian Herbicide Resistance Initiative, Phase 3	600,000
UWA00124	Efficacy of the Harrington Weed Seed Destructor in targeting weed seeds during the harvest of Australian grain crops	162,921
UWA00125	Weed Seed Wizard: validation and improvement of a weed management decision support tool	223,921
UWA00134	Developing and promoting integrated pest management in Australian grains	459,734
	Total Crop Protection	***12,496,559***
	Validation and Integration	
AAG00001	Agrilink crop topping	26,500
AEA00003	Caring for our Country	30,000
AEA00004	South-eastern Australia Grain and Graze 2 program	459,650
AES00004	Pilot farm management course	65,000
AES00005	GRDC's Farm Business Management Initiative	112,000
AOP00009	Building grower profitability through practical extension of broadleaf crop sequencing best practice using world-class methodology	275,000
AVP00001	Grain and Graze 2 program development in WA	30,000
AVP00002	WA grazing cereals roadshow	21,000
BBC00003	High Rainfall Zone Coordinator	23,259
BWD00012	Yielding benefits through partnerships	303,782
BWD00015	Grain and Graze for northern Victoria	15,000
BWD00018	Northern Victorian Grain and Graze 2 program	487,327
CAG00003	Western Region Agribusiness Trial Extension Network	12,500
CCC00005	The role of Bt (*Bacillus thuringiensis*) cotton in pest-suppressive landscapes	30,019
CFI00009	Guiding growers to more profitable and sustainable cropping systems in the western districts of the northern grain belt	171,705
COC00001-1	Caring for our Country 2—income	(375,000)
COC00001-3	Evaluation of Grain and Graze pre-program planning	46,000
CRC00002	Agribusiness Trial Extension Network	12,500
CSA00013	Southern Queensland Farming Systems	692,788
CSA00017	Achievable yields for irrigated grains in the Northern Region	208,130
CSA00023	Doing it better, doing it smarter—managing soil water in Australian agriculture	321,960
CSA00025	Water use efficient farming systems for the Mallee	349,840
CSA00026	Grain and Graze 2—national integration	292,710
CSA00027	Adding value to the GRDC's National Variety Trials network	375,000
CSP00109	Increasing water use efficiency in the northern sandplain region of WA	254,520
CSP00111	Identifying farm-scale opportunities to improve water use efficiency—a nationally coordinated systems approach	257,730
CSP00128	Maximizing crop yield in the high-rainfall zone of WA through efficient use of water and nutrients	493,305

Number	Title	Expenditure $
CWF00013	Increasing farm water use efficiency in central west NSW	364,100
CWF00014	Low Rainfall Collaboration Group—canola project	150,000
CWF00015	Low-rainfall collaboration project	200,000
CWF00016	Profit/risk workshops	200,000
DAN00102	CropMate—climate information for crop production	78,989
DAN00133	Agribusiness Trial Extension Network	12,500
DAQ00116	Central Queensland Sustainable Farming Systems, Phase 3	550,000
DAQ00129	Improving the integration of legumes in grain and sugarcane farming systems in southern Queensland	309,783
DAQ00162	Grain and Graze 2—Northern Region	514,500
DAS00089	Improving crop and farm water use efficiency in Australia	124,999
DAW00193	The agronomy jigsaw—finding the pieces that maximise water use efficiency	240,000
FFC00003	Western Region Agribusiness Trial Extension Network	12,500
FFC00004	Crop topping wheat WA	40,550
FGI00007	Grain and Graze 2—WA region	504,500
FLR00005	Catch More, Store More, Grow More: integrating soil and crop management to improve whole-farm water use efficiency in the mixed farming zone of southern NSW	210,900
FLR00006	Grain and Graze 2—Building resilient mixed farming systems in southern NSW	333,000
FPR00001	Practical financial figures for farm business management	465,245
GRA00001	Agribusiness Trial Extension Network	12,500
GSA00003	Agribusiness Trial Extension Network	12,500
HFG00006	Managing moisture for improved water use efficiency in the Southern Region	103,510
ICF00007	High-yielding winter cereal genotypes for irrigation for south-eastern Australia	139,456
IMA00006	Improved fallow management to maximise water infiltration and retention through better ground cover management and summer weed control	272,100
IMA00007	Agribusiness Trial Extension Network	12,500
KGR00002	Strategic review of investment analysis	50,000
LEA00001	Improving water use efficiency in Lower Eyre Peninsula farming systems	100,000
LIE00006	Improved stubble and soil management practices for sustainable farming systems in the Liebe area	246,289
LOL00001	Agribusiness Trial Extension Network	12,500
MFM00003	Improving farm water use efficiency on Kangaroo Island and in the south-east of South Australia	100,000
MIG00010	Grower Group Alliance	308,907
MLA00002-2	Eyre Peninsula grazing cereals roadshow	4,000
MUN00001	Agribusiness Trial Extension Network	12,500
NGA00001	Validation and integration of new technology through grower groups in north-west NSW and south-west Queensland grain-growing zones	359,615
NGA00002	Validation and integration of new technologies and production systems in the north-east NSW grain-growing region—North East Farming Systems	302,730
NRS00005	National leadership and mentoring	86,000
NRS00006	Regional risk workshops	70,000
OCR00001	Best practice benchmarking	28,114
OHC00001	Western Region Agribusiness Trial Extension Network	12,500
ORM00002	Farm business updates	144,130
ORM00003	Farm business management newsletters	39,270
PAL00016	Building grower profitability through practical extension of broadleaf crop sequencing best practice using world-class methodology	375,000

Number	Title	Expenditure $
PDR00001	Development of a business plan for the joint GRDC–MLA mixed farming systems	31,300
PR185-1	Cropping in catchments	12,738
PR185-2	Caring for our Country	403,422
PR185-3	Caring for our Country—set up website	39,677
PR185-5	Grain and Graze workshop	500
PR251-1	Water use efficient farming systems—completing the program	6,425
PR93-4	5th World Congress of Conservation Agriculture 2011	43,187
RDP00005	Southern Region Agribusiness Trial Extension Network	12,120
RMCG00001	Facilitate national workshop	55,000
RMS00002	Agribusiness Trial Extension Network	12,500
ROB00001	Southern Region Agribusiness Trial Extension Network	12,500
ROE00001	Evaluation activities for Grain and Graze 2	137,000
RPI00007	Improved water use efficiency in no-till cropping and stubble retention systems in spatially and temporally variable conditions in the riverine plains	200,159
RPI00008	Agribusiness Trial Extension Network	12,500
SFS00019	Optimising the profitability of high-rainfall zone cropping in south-west Victoria through improved water use efficient farming systems	194,940
SFS00020	Southern Victorian Grain and Graze 2 program	351,946
UA00107	Eyre Peninsula Farming Systems 3—responsive farming systems	345,339
UA00117	Eyre Peninsula Grain and Graze 2	202,029
UNF00001	Increasing farm water use efficiency in the upper north of South Australia	125,000
URS00002	Analysing solutions survey data	16,000
UT00016	Improved water use efficiency of rain-fed and irrigated farming systems in Tasmania	122,320
UT00020	Increasing water use efficiency in mixed crop–livestock systems in Tasmania	150,000
WAN00015	WANTFA Technology Demonstration Site	107,140
WWL00002	Realising yield potential through farming systems RD&E—Western Region	164,510
	Total Validation and Integration	***14,866,164***
	Extension and Grower Programs	
ADW00001	GRDC extension portal	84,600
BGC00001	Improving practice of spray drift management techniques	300,000
BWD00016	Genetically modified canola agronomy	68,371
CEC00001	Integration of final reports onto the GRDC website	130,000
COR00019	Fact sheets for the GRDC website and publication	229,224
CQA00001	Extension provider upskilling—technology adoption	90,330
CRD00002	Drift Management Extension Strategy for the Northern Region	20,219
DAQ00158	Grain storage extension	511,835
DAW00194	Taking precision agriculture to the paddock—increasing the adoption of precision agriculture in the Great Southern region of WA	300,000
DAW00195	GRDC–DAFWA Western Regional Updates	20,000
DAW00200	Agribusiness Training Program GRDC-subsidised training project	33,000
EXH00001	GRDC website hit-wise accessibility	32,500
GHD00002	Continuation of GRDC–Agribusiness relationship	120,500
GHD00004	Review of GRDC historical portfolio for extension opportunities	90,000
GIA00001	GRDC–DAFWA Grains Research Updates—Western Region	100,000
GRF00001	Queensland Research Advisory Committee Coordination	44,000
ICN00011	GRDC Research Updates—Northern Region	195,000

Number	Title	Expenditure $
LSP00001	GRDC customer relationship management database	37,290
LWR00005	Annual contribution to AANRO	42,400
MDE00001	Database-cleansing services for the GRDC customer relationship management database	38,589
NCA00008	Improving market signals for the GRDC and the grains industry to enhance delivery to customers	25,000
NCA00009	GRDC intra-maps for customer relationship management database	16,200
NFA00008	Research Advisory Committees—northern and southern NSW	66,000
ORM00001	GRDC Research Updates—Southern Region	499,487
PR196-1	Further implementation of the GRDC agribusiness interaction strategy	3,098
PR197-1	Delivery of technical workshops to accelerate learning opportunities in the grains industry	3,675
PR233-1	Datasets for the GRDC customer relationship management database	1,890
PR236-1	Continuation of agribusiness relationship	1,152
PR241-1	Grains Research Updates for advisers and growers—north and south	16,136
PR242-1	Agribusiness and Regional Crop Updates—west	240
PR246-1	Alternative medium initiative	29,748
RBC00001	GRDC Technical Workshop—On-farm quality to processor quality	46,000
RCM00001	GRDC decision support tool audit	30,000
RDC00004	GRDC contribution to Collaborative Partnership for Farming and Fishing Health and Safety	120,000
RDC00006	Investing in Youth initiative	10,000
RMP00006	2010 and 2011 GRDC Research Update DVDs and vodcasts	45,000
RRA00008	RD&E project integration for the GRDC website	31,100
RRA00009	Update to the web service client publishing final reports received from the Centre for eCommerce and Communication	11,500
RRA00010	GRDC website—location-based content	25,700
RRA00011	Web feeds enhancements	15,800
RRA00012	GRDC website—community features including user-contributed content: accessibility and usability refresh	47,200
RRA00014	GRDC website—reporting tools	29,000
RRA00016	GRDC website—Weeds CRC website hosting	2,500
RRA00017	GRDC website—customisable web addresses	5,700
RRA00018	GRDC website—RD&E code aggregation	5,300
RRA00019	GRDC website—multiple file upload	8,500
RRA00020	GRDC website—Content management 'Managing Climate Variability' program website	16,500
RRA00021	GRDC website—link checking internal and outward-facing links on grdc.com.au	3,200
SAF00004	Research Advisory Committees—South Australia	33,000
SPA00010	Training and demonstration of precision agriculture in practice	300,250
TFG00001	Tasmanian Research Advisory Committee	11,000
UB00002	Online libraries for the GRDC website—digitisation of GRDC documents for online publication	95,000
UNE00013	Introduction and extension of integrated pest management in northern NSW	100,000
UNE00015	Graduate Certificate and Diploma in Sustainable Grains Production for industry advisors and growers	327,587
UWA00135	Map-based interactive web interface for PestFax	113,300
VFF00006	Research Advisory Committee—Victoria	33,000
	Total Extension and Grower Programs	***4,616,621***
	TOTAL PRACTICES	**48,992,151**

Number	Title	Expenditure $
	VARIETIES	
	Cross Varieties	
VR83-1	Varieties commercialisation	53,823
	Total Cross Varieties	***53,823***
	Gene Discovery	
ACP00002-Q	Australian Centre for Plant Functional Genomics, Phase 2	2,000,000
AGL00012	Verification of progress against selected GRDC (Varieties) performance indicators	34,931
ANU00014	The plasticity and genetic control of root development under mechanical impedance	299,874
BEL00002	National Frost Workshop	7,000
BWD00014	Benchmarking study of the economic, agronomic and environmental impacts of GM herbicide-tolerant canola	45,250
CSP00094	Fast tracking high-value traits using heavy ion technology	36,696
CSP00099	Triple Rust Initiative	1,200,000
CSP00107	Reverse genetic analysis of novel genes for resistance to necrotrophic fungal pathogens in wheat and barley	190,000
CSP00114	Analysis of plant defence responses to the broad host range fungal pathogen *Rhizoctonia solani*, using wheat and *Arabidopsis*	142,000
CSP00126	'Overgrowth' mutants of wheat and barley: new sources of genetic variation for growth, yield and grain quality	148,500
CSP00129	Fast-tracking gene discovery in wheat root systems with *Brachypodium distachyon*	200,000
CSP00130	Identification of wheat QTL for maintenance of grain number under reproductive-stage water stress conditions	190,000
DAN00117	Development of molecular markers for application in Australian canola breeding	379,833
DAN00117-UQ	Development of molecular markers for application in Australian canola breeding	105,612
DAN00123	Quarantine CIMMYT bread wheat germplasm	93,895
DAQ00085	Identifying candidate genes for stay-green in sorghum	160,000
DAQ00143	Optimised wheat root architecture for increased yield and yield stability in the face of a changing climate	207,045
DAS00087	Map-based cloning of the scald resistance gene Rrs1 'Turk'	99,960
DAV00098	Molecular markers for pulse-breeding programs	300,000
DAV00103	Establishing a SNP genomic resource for the Australian wheat industry	250,000
DAW00170	Development and implementation of molecular markers for narrow-leafed lupin breeding	175,000
DDM00001	South Australian Sowing Guide	9,566
GPG2	Grain Protection Genes	200,000
GRS115	GIRS—(ULA) Characterisation of the Xero2 (protein) system in *Arabidopsis thaliana*	20,000
ICA00007	Focused identification of germplasm for specific traits	239,820
UA00094	Flour and product colour in wheat	260,000
UA00101	Advancement of new genes for stem and leaf rust resistance from uncultivated relatives of wheat	184,340
UA00102	Australian Wheat and Barley Molecular Marker Program—genetic analysis module	1,000,000
UMU00025	Genetic dissection of fungal disease resistance in legumes using *Medicago truncatula*	494,726
UMU00028	Allele-specific markers for key glutenins	110,830
US00039	Australian Cereal Rust Control Program	1,965,385
USQ00010	Regional frost—calibration of frost chamber to encompass all Australian conditions	64,816
VR135-1	Further characterisation of two potential sources of reproductive frost tolerance in wheat	10,858
VR24-1	National Variety Trials	4,421,494

Number	Title	Expenditure $
VR64-1	Frost tolerance in wheat and barley	4,112
	Total Gene Discovery	***15,251,543***
	Germplasm Enhancement	
ANU00011	The generation of wheat cultivars with improved drought tolerance and agronomic traits	99,910
ANU00013	Identifying wheat germplasm with superior rubisco for breeding for increased drought tolerance	170,035
CIM00014	Identification and utilisation of novel sources of resistance against soil-borne pathogens in wheat	152,072
CIM00015	Enhanced delivery of CIMMYT germplasm to Australia	205,096
CIM00016	Enhancement of CIMMYT wheat-breeding strategy for drought tolerance and genotypes of relevance to rain-fed areas of Australia	360,152
CMB00016	Molecular Plant Breeding CRC—Education and Training Program	166,661
CSE00052	Resistance to cereal aphids in transgenic wheat	42,331
CSP00090	New disease protection for wheat—a block of genes for resistance to barley yellow dwarf virus, root lesion nematodes and rusts, plus potential yield boost	86,766
CSP00096	Crown rot-resistant bread wheat through new knowledge of epidemiology and genetics	617,462
CSP00131	Finding the balance between frost tolerance and flowering time in wheat	176,897
CSP00133	New sources of salt tolerance for wheat and barley	88,918
CSP00137	Increasing the capacity of wheat to extract phosphorus from soils	96,000
DAN00122	Durum Industry Development—Fast tracking genetic solutions to crown rot, Phase 2	169,996
DAN00124	Statistics for the Australian Grain Industry	611,772
DAN00137	Managed Environment Facility: Yanco	722,605
DAQ00104	Sponge and dough bread quality of Australian germplasm	350,000
DAQ00119	Genetic approaches to resistance to *Fusarium* and *Bipolaris* in wheat and barley	144,894
DAQ00122	Nationally coordinated frost trials and physiological studies of frost resistance in wheat and barley	180,000
DAQ00132	Integrating new technologies to improve yield stability and enhance genetic gain in barley and sorghum breeding programs	300,000
DAQ00133	Barley foliar pathogens	143,000
DAQ00142	Wheat pathology in the Northern Region—development of rapid screening methodologies for wheat diseases of importance	155,224
DAS00092	Provision of LMA (late maturity a-amylase) test kits to cereal breeders and researchers	34,698
DAS00096	Control of cereal fungal diseases	140,000
DAS00101	Development of molecular markers for cereal cyst	34,192
DAS00102	Breeding stem rust–resistant oat using wild *Avena* species	100,000
DAV00082	Improved selection for grain plumpness and malting quality	350,233
DAV00093	Plant genetic resources: Australian Temperate Field Crops Collection	243,256
DAV00104	Victorian Field Crop Nematology Project	78,123
DAW00162	Nationally coordinated frost trials—Western Region	73,000
DAW00173	Market intelligence gathering and market visits for wheat and barley breeders, growers, and marketers	95,000
DAW00189	Screening wheat and barley for salt tolerance in the field in WA and in a controlled environment—2009	50,000
DAW00198	Managed Environment Facility—Merredin	685,360
ICA00004	Enhancement of yield and yield stability of spring bread wheat in semi-arid Mediterranean areas of central and west Asia and north Africa	145,832
ICA00006	Breeding chickpea for drought tolerance and disease resistance	175,000

Number	Title	Expenditure $
PBB00001	Executive support for the Australian Winter Cereals Pre-breeding Alliance	22,917
PPA00003	Drought proofing of seed production for pre-breeding research in Australia	20,000
RWF00016	Review of the lupin industry	12,000
UA00063	Breeding for frost tolerance in barley	120,000
UA00090	Physiological-based screening for identifying novel salt-tolerant germplasm in wheat and barley	102,990
UA00093	Biochemical and genetic solutions to grain defects elimination and grain quality improvement	164,950
UA00099	Grain defect elimination in wheat	650,000
UA00100	Nationally coordinated frost trials—Southern Region	60,000
UA00106	Simplified phenotypic assay for product colour stability	162,420
UA00112	Development and evaluation of weed competitive wheat cultivars	140,058
UA00114	Frost tolerance in wheat	213,335
UA00115	Improving phosphorus use efficiency in wheat and barley	301,892
UA00116	Investigation of root traits and nutrient efficiency for durum wheat improvement	347,800
UA00118	Development of high salinity tolerant winter cereals germplasm	635,479
UMU00027	Quantification and pathogen race dissection of disease	108,000
UMU00029	Pre-emptive breeding for Russian wheat aphid resistance	370,000
UQ00043	CIMMYT–ICARDA suite of projects: Database Project	64,156
US00045	CIMMYT–ICARDA suite of projects: Communication Project	110,543
US00051	National managed environment facility: Narrabri	592,035
USQ00008	Durum Industry Development—Molecular marker assisted selection for crown rot resistance	70,000
UT00013	Targeting potassium homeostasis in breeding wheat for salt tolerance	50,334
UT00021	Water logging and acid soil screening of pulses	49,918
UWA00129	Generation of GM herbicide-tolerant narrow-leafed lupin	426,323
UWA00133	Improved nitrogen use efficiency in wheat and barley	299,418
VR134-1	Support for pre-breeding alliance activities	666
VR139-1	Identification of novel sources of disease resistance for the Australian wheat industry	2,779
	Total Germplasm Enhancement	***12,342,498***
	Wheat and Barley Breeding	
AGL00009	Report the terms and conditions for access to ticket-by-variety date at point of delivery	15,689
ANU00012	Disease resistance and epidemiology of scald and net form of net blotch	151,961
AVI00001	EPR collection systems	49,937
BA00003	Pilot brewing evaluation for malting barley lines destined for export	61,528
BRI00042	Wheat classification—variety operations	669,158
CIM00013	Australian Cereal Rust Control Program—adult plant resistance to wheat rusts	369,956
CMB00014	Accelerating breeding progress by predicting the effects of genes influencing yield and quality in wheat and barley	261,373
CMB00015	Fine mapping of rust resistance, yield and maturity loci in wheat	71,966
CMB00018	Molecular tools to support SSR and SNP genotyping capabilities in wheat and barley	139,076
CMB00019	Development of diagnostic markers capturing the range of allelic variation for major phenological adaptation genes in barley and wheat	60,924
CMI00001	Executive support to the Chair of the Wheat Classification Council	85,401
CSP00101	Breeding dual-purpose feed wheats for the high-rainfall zones	325,000
CUR00004	Wheat Quality Objectives Group	30,000

Number	Title	Expenditure $
DAM00001	Project review—durum pre-breeding	2,442
DAN00101	Barley Breeding Australia—Department of Primary Industries NSW	173,056
DAN00118	Australian Durum Wheat Improvement Program	518,972
DAN00118-UA	Australian Durum Wheat Improvement Program	356,792
DAQ00110	Barley Breeding Australia—northern node	1,073,177
DAQ00140	Climate change opportunity—Adaptation of winter cereals to northern and coastal Queensland, Stage 1	201,006
DAQ00141	Recurrent selection program in hexaploid wheat	96,701
DAR00003	Increasing the utility and efficiency of Diversity Arrays Technology (DArT) for wheat and barley breeders in Australia	100,000
DAS00091	National oat-breeding program for milling and feed end-uses	798,000
DAW00151	Barley Breeding Australia—western node	1,452,210
DAW00186	Barley quality—barley grain defects (blackpoint, pre-harvest sprouting, kernel staining)	20,000
DAW00192	Improving understanding of Middle Eastern market requirements for Australian wheat	100,000
MPC00004	Wheat-breeding liaison	1,551
PAP00002	Establishment of a national pilot malting facility	5,000
QOG00002	Wheat classification	1,920
RSE00001	Chair of the Wheat Classification Council	31,735
SED00001	EPR collection agent	83,400
UA00032	Barley Breeding Australia—southern node	1,799,968
UA00108	Barley quality: characterisation of genetic variation for alpha amylase alleles	104,098
US00049	National Triticale Improvement Program 1	589,481
USQ00011	Seedling and field-based phenotyping of crown rot symptoms in wheat and barley	170,000
UWA00118	Barley improvement through germplasm—coordination, introduction and evaluation	162,476
VR01-5	Barley breeding	2,187
VR114-1	Barley improvement through germplasm introduction, evaluation and enhancement	2,356
VR161-1	Facilitating industry-wide improvements in EPR administration and collection	4,957
VR162-1	Wheat classification—delivery on the Wheat Industry Expert Group's recommendations regarding wheat classification and the Wheat Quality Objectives Group	22,067
VR79-1	National Wheat Breeders' Alliance and Cereal Breeders' Week	1,855
	Total Wheat and Barley Breeding	***10,167,376***
	Pulse, Oilseed and Summer Coarse Grains	
AOF00008	Canola Quality Objectives Group	30,000
CSP00104	Australian Soybean Breeding Program	450,000
DAN00094	Australian Chickpea Breeding Program	1,086,426
DAN00108	National Brassica Germplasm Improvement Program	279,999
DAN00112	Identification and utilisation of field pea sources for bean leafroll virus resistance	40,000
DAQ00117	Sorghum Core Breeding Project	599,430
DAQ00128	National Mungbean Improvement Program	265,000
DAQ00138	Sorghum Midge Testing Scheme	15,000
DAQ00155	Maize germplasm enhancement and productivity improvement	154,896
DAQ00159	Potential opportunities for Australian maize marketed to South Korea, Japan, Taiwan and Philippines	18,000
DAS00066	Pulse germplasm enhancement—vegetative and reproductive frost tolerance in pulse crops	86,855

Number	Title	Expenditure $
DAS00067	Pulse germplasm enhancement—bacterial blight in field pea, pod drop in lentil, and heat stress tolerance in field pea and faba bean	144,362
DAS00080	Lupin evaluation for eastern Australia	99,986
DAS00086	New vetch varieties for grain and hay production for Australian farmers	250,004
DAS00107	Development of herbicide-tolerant pulses	199,395
DAS00108	Improving yield and reliability of field peas under water deficit	150,000
DAS00112	Lupin evaluation for eastern Australia	100,000
DAV00071	Australian Field Pea Breeding Program	853,953
DAV00072	Australian Lentil Breeding Program	497,988
DAV00073	Pulse germplasm enhancement—boron and salt tolerance in temperate pulses and durable ascochyta blight resistance in chickpeas	53,776
DAV00085	Australian Canola Germplasm Enhancement Program	250,000
DAV00086	Canola Quality *Brassica juncea* Program	150,000
FWC00001	Coordinator for Pulse Breeding Australia	23,641
MGP00002	Australian National Blackleg Resistance Rating System	92,300
PCA00001	Australian Peanut Genetic Improvement Program	300,000
PCA00002	Investigations into off-flavour contamination in peanuts	102,000
UA00097	Australian Faba Bean Breeding Program	760,109
UCS00011	Eastern Australia Lupin Breeding II	13,000
UM00034	Identification of resistance genes in Australian canola cultivars through development of a differential set of blackleg isolates	98,000
UQ00042	Professorial Chair in Crop Science	76,418
UWA00119	Higher yielding elite lines of pearl lupin for Australian agriculture	60,000
UWA00121	Improved herbicide tolerance for break crops	199,194
UWA00137	Training course: Collaborative breeding—improved on-farm testing with grower	25,000
UWA00140	Biotechnology tools to accelerate lupin and lentil improvement	179,988
VR116-1	Pulse Breeding Australia	4,800
	Total Pulse, Oilseed and Summer Coarse Grains	***7,709,520***
	TOTAL VARIETIES	**45,524,760**
	NEW PRODUCTS	
	Cross New Products	
NP45-1	New products commercialisation	119,543
	Total Cross New Products	***119,543***
	New Farm Products and Services	
AGL00013	Review—Non-wetting soil	8,977
ANU00015	Evaluation of plant manipulation compounds	99,429
BRI00040	A new baking process for Asia	723,000
BRI00045	Australian wheat for China	85,000
BRI00046	Compression tester	31,188
BRI00047	GM accreditation for test milling laboratory	10,000
CAD00001	Registration and commercialisation of new chemicals	42,041
CGS00001	Harrington Weed Seed Destructor	195,750
CGS00002	Harrington Weed Seed Destructor Prototype 2	6,000
CGS00003	Harrington Weed Seed Destructor Prototype 3	100,000

Number	Title	Expenditure $
CSE00040	Registration and extension of the use of new ethyl formate formulations on stored grain and for structural treatment	188,044
CSE00044	Identifying mechanisms involved in phosphate solubilisation and plant-growth promotion by *Penicillium*-based rhizosphere inoculants	172,100
CSE00045	Microbial tagging for tracking: Root disease biocontrol efficacy and environmental fate of microbial inoculants in crop rotations	173,008
CSE00050	Identification of feeding attractants to assist baiting technologies for Mediterranean snails	101,624
DAN00097	National independent quality assurance and germplasm maintenance for *Rhizobium* inoculants	111,261
DAN00134	DNA investigation and long-term storage of barley samples	7,500
DAR00004	Barley variety identification DNA quality testing	21,958
DAS00110	Novel products to control plant pathogens in broadacre crops	228,582
DAW00197	Barley variety identification statistics: statistical analysis of the sampling procedures for malting barley seed	6,000
DGQ00003	Combine harvester fires project	10,000
GTL00001	Endophyte technologies for modern cereals	420,000
KAP00001	On-farm storage survey	30,000
MEC00001	Weevil Wacker	100,000
NP45	Commercialisation	(107,348)
NP50	Harrington Weed Seed Destructor—Post-harvest chaff treater	(2,821)
PAC00002	Snail market survey	36,100
PR228	Integrated weed management engineering solutions to herbicide resistance	2,250
SAC0001	Use of biopolymers as pesticides	112,880
SHE00002	Germplasm collection Armenia, Syria and Georgia	10,000
UCS00012	Discovery of novel compounds as leads for natural herbicides	290,321
UCS00013	Biological control of pest snails in Australia using native nematodes	189,717
UCS00016	Biopesticides for the Australian grains industry	177,358
OF00007	Beneficial Microbes Program—progressing new microbial products for Australian grain production to commercialisation	300,000
UM00040	Increasing feed grain digestibility: probiotics and enzyme additives	210,965
UMU00032	National Rhizobium Program—Managing rhizobia to maximise nitrogen fixation by legumes in agriculture	510,000
UQ00046	Fertiliser from Waste, Phase I	272,983
UQ00048	Insecticidal peptides from natural predators	399,640
US00050	Formulation and application of beneficial microbial inoculants for agriculturally important crops	45,088
USA00008	Weed seed termination method of harvest	276,012
UT00018	Microbial T-RFLP (terminal restriction fragment length polymorphism) screening as a solution for premature yeast flocculation (PYF) assurance for malt and malting barley exports	65,246
UWA00113	Demonstration of UWA microspectrometer technology for assessment of soil and grain parameters in broadacre agriculture	399,485
	Total New Farm Products and Services	***6,059,338***
	New Grain Products	
BBE00010	GRDC facilitator for commercialisation of yield gene technology	14,689
BSA00001	Feed grain partnership Australian Bureau of Statistics 2009–10 feed grain data collection	82,200
CFF00001	Understanding community attitudes and behaviours toward cereals and dietary carbohydrates	50,000

Number	Title	Expenditure $
CFF00002	Novel mechanisms for enhancing wheat yield and quality	1,061,228
CGF00001	Grain Foods CRC Limited	500,000
CGF00002	Grain Foods CRC Limited—director fees	21,254
CSA00012	Energy efficiency, self-sufficiency and production at farm to regional scale	26,184
CSE00049	Crop Biofactories Initiative 2—Joint Innovation Agreement	2,037,151
CSE00053	Bio-routes to fertilisers	130,137
CSP00102	Omega 3 LC-PUFA (long-chain polyunsaturated fatty acid) canola oil for Australia	350,000
CSP00112	Wheat starch for specialty markets	200,000
CSP00113	Coeliac-friendly cereals, Phase 4	210,469
CSP00118	Australian Feedgrain Partnership sorghum project	259,000
CUR00007	Superior quality lupin breads using low-protein wheat flour	30,000
CUR00008	Market study for product development technologies for nurturing small and medium-sized bakeries	30,000
CUR00009	Modelling processing of bread dough and bread texture—a structural mechanics	30,000
DRD00002	Improving the utilisation of red wheat by lactating dairy cows	40,000
DWB00001	Yield gene EOI evaluation: independent panel member	11,996
GOG00001	Go Grains—membership subscription	250,000
GOG00006	Go Grains Health & Nutrition Limited	100,000
NPB00004	Grain Hygiene Program for CRC for National Plant Biosecurity	1,800,000
PBS00007	Yield gene technology science review	4,542
PBS00008	Independent assessment of the merit of the Next Generation Wheat proposal	5,000
PCL00003	Sorghum lines with enhanced starch availability for pigs and ethanol production	55,226
PCL00005	Enhancing near-infrared spectroscopy calibrations for predicting the nutritional value of grains for livestock	100,287
PRD00002	Manager feed grain partnership	22,727
RWF00017	Identification and selection of international safflower germplasm for importation into Australia	7,125
SMC00001	Go Grains Health & Nutrition Limited—director fees	29,068
UCS00015	Canola meal proteins for optimal food functionality	15,000
US00048	Assessment of novel technology to generate value-added biofuels and chemicals from Australian grain crops	125,000
WJM00004	Coordination of registration of grain storage chemicals	64,948
	Total New Grain Products	***7,663,231***
	TOTAL NEW PRODUCTS	**13,842,112**
	COMMUNICATION & CAPACITY BUILDING	
	Building Research Capacity	
ACP00006	Linking 'Get into Genes' with Primary Industry Centre for Science Education	45,000
ARL00007	Australian Rural Leadership Foundation	98,000
ATA65	Agricultural Training Award (ATA)—to study at the Longerenong College, Victoria	3,000
ATA66	ATA—to study at the Longerenong College, Victoria	3,000
ATA67	ATA—to study at the Longerenong College, Victoria	3,000
ATA68	ATA—to study at the Longerenong College, Victoria	3,000
ATA70	ATA—to study at the Longerenong College, Victoria	3,000
ATA71	ATA—to study at the Tocal College, CB Alexander Campus	3,000
ATA72	ATA—to study at the Tocal College, CB Alexander Campus	3,000
ATA73	ATA—to study at the WA College of Agriculture, Cunderdin	3,000

Number	Title	Expenditure $
ATA74	ATA—to study at the WA College of Agriculture, Cunderdin	3,000
ATA75	ATA—to study at the WA College of Agriculture, Cunderdin	3,000
ATA76	ATA—to study at the WA College of Agriculture, Cunderdin	3,000
ATA77	ATA—to study at the Longerenong College, Victoria	3,000
CSD00004	Sponsorship—BHP Billiton Science Awards	30,000
CSO00042	Travel Award (TA)—invitation as keynote speaker to the 3rd International Biochar Conference	3,500
DAF0002	2009 Science and Innovation Awards for Young People in Agriculture, Fisheries and Forestry	20,000
DAN00136	TA—to attend a plant breeding for drought tolerance training course at Colorado State University	2,500
DAQ00146	TA—to attend the International Conference on Challenges to Biodiversity and Environment for Sustainable Development	(3,375)
DAS00103	TA—to attend as invited speaker to the No-Till on the Plains Winter Conference in Kansas, United States	4,200
DAS00104	TA—to attend the 12th Symposium on Forage Crops in Serbia, on forage crops as a basis of sustainable development for animal husbandry in a Mediterranean environment	3,980
DAS00105	TA—to attend the 5th International Food Legumes Research Conference and 7th European Conference on Grain Legumes, in Turkey	2,900
DAS00106	TA—to attend the 5th International Food Legumes Research Conference and 7th European Conference on Grain Legumes, in Turkey	2,900
DAV00100	TA—to attend the 5th International Food Legumes Research Conference in Turkey; discuss gene bank coordination with the Biodiversity and Global Diversity Trust in Italy; visit the brassica germplasm collection in Spain	4,419
GRS116	Grains Industry Research Scholarship (GIRS)—(UMU) The role of secondary metabolites in legume defence against fungal pathogens, investigated using the model legume	10,415
GRS118	GIRS—(USC) Nanotechnology and locked nucleic acid probes for DNA diagnostics and genotyping in grains	15,000
GRS120	GIRS—(UM) Population genetics of the lucerne flea with applications for biocontrol	12,500
GRS123	GIRS—(UQ) RNA (ribonucleic acid) silencing in plants	35,000
GRS124	GIRS—(UQ) Novel genes regulating plant defence	30,000
GRS125	GIRS—(QUT) Characterisation of the NF-Y family of transcription factors in wheat	30,000
GRS126	GIRS—(UWA) The design of biodiversity conservation contracts under uncertainty	13,782
GRS127	GIRS—(CUR) Adaptations for growing wheat in a drying climate	18,750
GRS128	GIRS—(UMU) A bioinformatics approach for identification of pathogenicity factors/ fungicide targets in *Stagonospora nodorum* and closely related necrotrophic fungi	18,750
GRS129	GIRS—(UA/ACPFG) Characterisation of transcription factors important in regulating salinity tolerance	20,000
GRS131	GIRS—(US) Novel plasmodesmatal proteins and their role in transport in plants	27,500
GRS132	GIRS—(UNS) Amelioration of irrigation salinity for wheat cultivation using cyanobacteria and mycorrhizal fungi	32,500
GRS134	GIRS—(UF) Characterising the molecular basis of the beneficial plant–endophytic actinobacteria relationship	40,000
GRS135	GIRS—(US) Physiological tolerance mechanisms of rhizobia in response to desiccation	30,000
GRS136	GIRS—(US) Epidemiology and host resistance of *Fusarium* head blight	51,000
GRS137	GIRS—(UF) Investigation of the differences between R protein activation in wheat and flax plant species	30,000
GRS138	GIRS—(US) Genetic improvement of grain quality for bread making in triticale	30,000
GRS139	GIRS—(US) Genetics of *Hordeum bulbosum*-derived rust resistance in cultivated barley	30,000

Number	Title	Expenditure $
GRS140	GIRS—(UCS) The relationship between earliness and vigour in cereals	30,000
GRS141	GIRS—(UQ) Investigation of techniques to rapidly introgress new genes into adapted bread wheat cultivars	22,765
GRS142	GIRS—(DAS) Genetic and physiological characterisation of resistance to root lesion nematode *Pratylenchus* species in wheat	30,000
GRS143	GIRS—(SWI) Molecular analysis of the GSP and puroindoline genes, related to grain hardness and antimicrobial properties	40,000
GRS144	GIRS—(UA) Structural basis of catalysis and substrate specificity of barley xyloglucan endotransglysocylases (HvXETs)	30,000
GRS145	GIRS—(ULA) Regulation of the XERO2 dehydrin gene in *Arabidopsis*	30,000
GRS147	GIRS—(UCS) Investigation of the use of biochar to enhance soil physical and chemical properties under dryland cropping	30,000
GRS148	GIRS—(UNE) Biological indicators and potential amendments to improve soil health crop productivity and profitability	30,000
GRS149	GIRS—(UCS) The role of decision support tools in farm business decision making	30,000
GRS150	GIRS—(US) Metallic nanoparticle phytosynthesis	30,000
GRS151	GIRS—(UMO) The effect of adsorption of the properties and structure of nanostructured emulsions	30,000
GRS152	GIRS—(UQ) Development and validation of molecular disease resistance markers for use in lucerne breeding	15,000
GRS153	GIRS—(UWA) The effect of biochar on soil organic matter and soil biological populations	31,515
GRS154	GIRS—(UM) Integrated and sustainable control of pest mite and aphid species in the context of climate change	30,000
GRS155	GIRS—(UT) The effect of crop rotation and irrigation on water use efficiency and soil health of grain crop production in Tasmania	30,000
GRS157	GIRS—(UCS) Improved drought avoidance for water-limited environments in Australian cereals	40,000
GRS158	GIRS—(UF) Analysis of the structure, biochemical properties and mode of action of flax rust resistance proteins	30,000
GRS159	GIRS—(CSP) Improved knowledge of crown rot pathogen biology and toxigenicity to safeguard market access of Australian wheat	30,000
GRS160	GIRS—(UA) *Phoma koolunga*: biology and role in ascochyta blight of field peas	30,000
GRS161	GIRS—(ULA) The role of intracellular localisation signals in NHX antiporter regulation in *Arabidopsis*	30,000
GRS162	GIRS—(CUR) Defining the wheat quality requirements for Indian whole wheat chapati	20,000
GRS163	GIRS—(UWA) Investigating mitochondrial proteome differences between stress-tolerant and stress-susceptible wheat genotypes	30,000
GRS165	GIRS—(UWA) Improving sustainable agriculture by doubled haploid (DH) technique in legumes—a holistic approach	30,000
GRS166	GIRS—(UCS) Health benefits of phenolic compounds and protease inhibitors of Australian-grown faba bean varieties	35,000
GRS167	GIRS—(UA) Late maturity alpha-amylase in wheat	30,000
GRS171	GIRS—(ANU) A biochemical approach to understanding *Stagonospora nodorum* toxin proteins	7,292
GRS172	GIRS—(UNE) Root vigor of cereal genotypes in response to phosphorus nutrition	15,000
GRS174	GIRS—(CSP) Effects of carbon dioxide on the epidemiology of crown rot infection in resistant and susceptible wheat cultivars	6,250
GRS175	GIRS—(US) Identifying site-specific crop production risk	9,114
GRS176	GIRS—(UA) Genetic and physiological studies in wheat to mitigate heat stress during grain filling	15,000

Number	Title	Expenditure $
GRS177	GIRS—(UWA) The financial viability of biochar production and application: policy implications	912
GRS179	GIRS—(ULA) Homeostatic sensing and feedback regulations of sodium-proton antiporter expression in *Arabidopsis*	10,000
GRS180	GIRS—(US) The basis of chickpea heat tolerance under semi-arid environments in India and Australia	10,937
GRS181	GIRS—(UA) Confirmation and characterisation of a Na+ (sodium) exclusion gene in barley	12,500
GRS183	GIRS—(UWA) Uncovering changes in the molecular networks of protein oxidation underpinning cereal crop responses to environmental stress	1,823
GRS184	GIRS—(ANU) Gene regulation in plant adaptation to stressful environments and drought conditions	9,114
GRS185	GIRS—(CUR) The effect of heat treatment and processing techniques on the quality of Australian sweet lupin flour	10,000
IDA00041	Industry Development Award (IDA)—Increasing water and nitrogen use efficiency of wheat, using crop imagery	4,950
IDA00042	IDA—Innovation in liquid fertilisers	15,000
IDA00043	IDA—New Zealand No-Till Study Tour	18,960
IDA00044	IDA—Across Borders Tour	12,620
IDA00045	IDA—Getting on track—FarmLink study tour of no-till farming systems in SA	14,400
IPR00002	Vavilov–Frankel Fellowships	24,639
IST55	IST—(DAFWA) Characterising chilling-induced sterility in wheat lines reputed to vary in frost damage during flowering	8,000
IST56	IST—(DAFWA) Small scale dough rheology/technology transfer—Dough maximum resistance and extensibility using the TA-XT2 (2i) (texture analysis) training	2,650
IST57	IST—(UNS) to attend Genotypic Variation in Antioxidant Activity of Peanut Kernels at the 42nd Annual Meeting of the American Peanut Research and Education Society in Florida, United States	3,000
NUF00008	Nuffield Australia Farming Scholarships	47,000
NUF00009	Nuffield Australia Farming Scholarships	141,000
SF29	Senior Fellowship—(UA) Regulatory control of nitrogen fixation capacity in legume nodules	13,500
UHS141	Undergraduate Honours Scholarship (UHS)—(UQ) To identify the *Brassica* species gene involved in the gene for gene interaction with the pathogen *Leptosphaeria maculans*, the causal agent of the disease blackleg	6,000
UHS142	UHS—(DAV) Transcriptome sequencing of field pea (*Pisum sativum* L.)	6,000
UHS143	UHS—(UQ) Prospecting novel plant genes associated with *Fusarium* resistance	6,000
UHS144	UHS—(UA) Grazing tolerance of wheat	6,000
UHS145	UHS—(UCS) Canopy manipulation to increase water use efficiency of wheat	6,000
UHS146	UHS—(UWA) Improving nitrogen use efficiency through foliar uptake of liquid nitrogen	6,000
UHS147	UHS—(UA) Selenium speciation and distribution in fertilised wheat grains	6,000
UHS148	UHS—(CUR) Varietal and environmental salt and boron tolerance of cereals in the early stages of growth	6,000
UHS149	UHS—(UA) Wild radish resistance to hormone herbicides in South Australia	6,000
UHS150	UHS—(UCS) Agronomic benefits of decreasing inorganic fertiliser use through utilisation of composts	6,000
UHS151	UHS—(US) The physiological basis of water use efficiency in a diverse set of international chickpea genotypes	6,000
UHS152	UHS—(UWA) Investigating the role of AtERF14 (ethylene response factor gene family) in defence against necrotrophic pathogens	6,000
UHS153	UHS—(UQ) Infection studies of peanut leaf pathogens	6,000

Number	Title	Expenditure $
UHS154	UHS—(UA) Measuring and managing soil carbon for improved nutrient acquisition in south-east Australian cropping systems	6,000
UHS155	UHS—(UWA) Comparing the effectiveness of chemical options (lime and gypsum) to genetic option (aluminium-tolerant wheat) to the aluminium-toxicity problem	6,000
UHS156	UHS—(UQ) Robust plant protection from improved knowledge of pathogen evolution under a changing climate	6,000
UHS157	UHS—(UA) Role of precision agriculture in improving crop water use efficiency	6,000
UT00019	Primary Industry Centre for Science Education, Phase 3	150,000
UWA00120	Capacity building in plant-breeding education and research at UWA	125,128
	Total Building Research Capacity	***2,260,290***
	Corporate Communications	
AAC00006	Conference Sponsorship (CS)—Australian Grains Industry Conference 2010	10,000
ABL00001	CS—Using manures and organic wastes in grain cropping	7,500
AFQ00008	CS—AgForce state conference—Landscape, Leadership and Learning—2010	5,000
AGH00002	*Clay Delving and Spreading* booklet	53,106
AIA00005	CS—Australian Institute of Agricultural Science and Technology: The Future for Agricultural R&D in Australia	7,500
AMI00001	CS—Australasian Milling Conference 2010	7,750
ASA00005	CS—15th Australian Society of Agronomy Conference	30,000
ASD00001	CS—6th Australasian Soilborne Diseases Symposium	5,000
AUG00002	2010 Australian Grain Yearbook	20,000
BA00004	Australian Barley Varieties: Quality Reference Guide	20,000
BAE00019	CS—Outlook 2010	7,273
BER00008	Production of Crop Growth Stages back pocket guides	109,100
BER00009	Adjuvant publication	38,800
BER00010	International Grains Research Review	29,874
BWD00017	CS—Grains Research Expo and Conference	10,000
CAN00003	Warehousing and distribution of the GRDC's publications, periodicals and promotional material 2009–2012	36,664
CAT00002	CS—2010 Annual Conservation Agriculture Conference	5,000
CCR00001	CS—Cropping Solutions Seminar	5,000
CFM00009	Crawford Fund Annual Development Conference 2010	10,000
CIC00006	Western Region communicator services	99,725
CIC00007	Northern Region communicator services	99,882
CIC00009	Communication campaign strategy development 'Wheat Breeding—National' and specific material for grower updates	34,612
CIC00010	High-rainfall zone communication strategy and services	62,555
CIC00011	Communication campaign strategy and development and implementation for 'Crown Rot'—Northern and Southern region–specific material	76,401
CIC00012	Wheat breeding issues-based communication campaign strategy implementation	189,793
CIC00013	Regional panel profile	94,050
COR00013	GRDC articles to appear in *Farming Ahead*	35,824
COR00017	*Ground Cover* supplements	30
COR00018	*Ground Cover* newspaper	918,169
COR00020	Ground Cover Direct publication catalogues	40,000
COR00021	Repurposing of research report information for a grower audience	165,000

Number	Title	Expenditure $
COR00022	Back Pocket Guides	40,000
CSP00103	CS—CSIRO Plant Industry Summer Studentship Program	35,000
DAQ00156	CS—DEEDI Hermitage Research Station Schools' Plant Science Competition	3,500
DAQ00157	TA—Participate in the Plant and Animal Genome XVIII Conference, conference workshops and plenary sessions in California, and visit sorghum research collaborators in Texas, United States	5,000
ECO00004	Issues-based communication—Northern Region: Nematodes	30,411
FIN00001	The Ute Guide	38,630
GGA00002	CS—Innovation Generation conference partnership	100,000
GIT00003	CS—Weather—Its Impact on your Farm Business Management Decisions	5,000
GRO00001	CS—South Australian Groundsprayers Association Annual Conference 2010	5,000
JLC00014	Adviser Update Sheets	103,000
KDI00017	Advertising in *Farming Ahead* magazine	27,000
KDI00019	CS—Farming Ahead 2010 Conference	10,000
KDI00020	Communication campaign strategy development and implementation for 'Frost'—Western Region–specific material	13,095
KDI00021	Communication strategy development and implementation for 'Non-Wetting Soils'—Western Region–specific material	7,457
MMA00006	The 'COB' Magazine	15,000
NFF00002	CS—National Farmers' Federation 2010 National Congress	33,636
NPB00009	CS—Global Biosecurity 2010: safeguarding agriculture and the environment	12,000
NYS00001	CS—National Youth Science Forum	30,000
NZS00001	CS—17th Australasian Weeds Conference	5,000
OBR00002	GRDC's Driving Agronomy	86,500
PIG00005	Delivering professional development through Partners in Grain	230,000
PNS00004	Southern Region communicator services	179,783
PNS00008	Regional Panel Electronic Newsletter	54,000
RGH00001	Australian Summer Grains Conference	12,000
RMH00004	CS—Golden Grains Exhibit: Ground Grub—Growing Great Grains	9,900
RSS00009	A Guide to Communication for Sustaining Families and Farms	97,500
SAN00019	CS—12th Annual SANTFA Conference 2010	5,000
SEP00006	CS—SEPWA Harvest Debrief	5,000
SEP00007	CS—Healthy Farms and Healthy Families—Annual SEPWA Ladies' Day and Dinner	5,000
SPA00011	CS—Precision Ag Expo	5,000
TFG00002	CS—2010 Tasmanian Farmers and Graziers Association Biennial Conference 'Tasmania as the Country's Food Bowl: Fact or Pipedream'	5,000
VAN00005	CS—8th Annual VNTFA Conference	5,000
VFF00010	CS—Victorian Farmers Federation Annual Grains Conference 2010	5,000
VIC00008	CS—GRDC Irrigation Update	4,000
WAF00006	CS—WAFarmers 2010 Annual Conference	5,000
WAN00018	CS—19th Annual WANTFA Conference	5,000
WDH00001	CS—National Centre for Farmer Health Conference—Opening the Gates on Farmer Health	1,000
WDM00007	Paddock Diary 2009–10, 2010–11 and 2011–12	72,525
	Total Corporate Communications	***3,544,545***
	TOTAL COMMUNICATION & CAPACITY BUILDING	**5,804,835**

Number	Title	Expenditure $
	CORPORATE STRATEGY & IMPACT ASSESSMENT	
	Enhanced Management	
AAA00006	Agrifood Awareness Australia Limited (2009–12)	100,000
ACG00003	Review of GRDC impact assessment	63,545
AGP2	Australian Grain Technologies Pty Ltd—independent directors	53,929
ATR00005	2009 impact assessments	1,830
ATR00007	2010 impact assessments	77,200
BAE00013	Expert advice for the economic and strategic development of the Australian grains industry	220,045
BAE00017	Australian Agricultural and Grazing Industries Survey and Grains Industry Reports: 2009–10, 2010–11 and 2011–12	580,600
BAE00018	GRDC–Australian Bureau of Agricultural and Resource Economics Harvesting Productivity initiative	1,089,000
DCC00002	HRZ Wheats and Canola Breeders WA—independent directors	50,668
GRD16-1	Impact assessment	8,431
GRD18-1	National Grains RD&E Strategy	27,457
GRD6-1	Consultancy services	27,314
GRD6-11A	Northern Panel industry consultation meeting	30,676
GRD6-2	Western Panel industry engagement forum	23,434
IPS00002	GRDC Grower Survey 2010	221,380
MLP00001	Consultancy Services for Western Panel	12,000
	Total Enhanced Management	***2,587,509***
	TOTAL CORPORATE STRATEGY & IMPACT ASSESSMENT	**2,587,509**
	GRAND TOTAL	**116,751,367**

AANRO = Australian Agriculture and Natural Resources Online, ANU = Australian National University, ACPFG = Australian Centre for Plant Functional Genomics, ATA = Agricultural Training Award, CIMMYT = International Maize and Wheat Improvement Center, CRC = cooperative research centre, CSP = CSIRO Plant Industry, CS = Conference Sponsorship, CUR = Curtin University of Technology, DAFWA = Department of Agriculture and Food, Western Australia, DAQ = Queensland Department of Primary Industries, DAS = South Australian Research and Development Institution, DAV = Department of Primary Industries Victoria, DEEDI = Queensland Department of Employment, Economic Development and Innovation, EPR = end point royalty, GIRS = Grains Industry Research Scholarship, ICARDA = International Center for Agricultural Research in the Dry Areas, IDA = Industry Development Award, IST = In-service Training Award, MLA = Meat and Livestock Australia, QTL = quantitative trait loci, QUT = Queensland University of Technology, RD&E = research, development and extension, SA = South Australia, SAI = Sustainable Agricultural Initiative, SANTFA = South Australian No-Till Farmers Association, SEPWA = South East Premium Wheat Growers Association, SNP = single nucleotide polymorphism, SSR = simple sequence repeat, SWI = Swinburne University of Technology, TA = Travel Award, UA = University of Adelaide, UCS = Charles Sturt University, UF = Flinders University, UHS = Undergraduate Honours Scholarship, ULA = La Trobe University, UM = University of Melbourne, UMU = Murdoch University, UNE = University of New England, UNS = University of New South Wales, UQ = University of Queensland, US = University of Sydney, USA = University of South Australia, USC = Southern Cross University, UWA = University of Western Australia, UWS = University of Western Sydney, VNTFA = Victorian No-Till Farmers Association, WA = Western Australia, WANTFA = Western Australian No-Tillage Farmers Association

Summary of GRDC project expenditure		
Practices	Agronomy, Soils and Environment	17,012,807
	Crop Protection	12,496,559
	Validation and Integration	14,866,164
	Extension and Grower Programs	4,616,621
	Total Practices	**48,992,151**
Varieties	Cross Varieties	53,823
	Gene Discovery	15,251,543
	Germplasm Enhancement	12,342,498
	Wheat and Barley Breeding	10,167,376
	Pulse, Oilseed and Summer Coarse Grains	7,709,520
	Total Varieties	**45,524,760**
New Products	Cross New Products	119,543
	New Farm Products and Services	6,059,338
	New Grain Products	7,663,231
	Total New Products	**13,842,112**
Communication & Capacity Building	Building Research Capacity	2,260,290
	Corporate Communications	3,544,545
	Total Communication & Capacity Building	**5,804,835**
Corporate Strategy & Impact Assessment	Enhanced Management	2,587,509
	Total Corporate Strategy & Impact Assessment	**2,587,509**
	GRAND TOTAL	**116,751,367**

A canola crop being harvested.
Photo: Emma Leonard

Appendix C: Joint R&D project list

R&D partners	Number	Title	Start date	Finish date
ACIAR, GRDC	ACA4	Pulse project with ICARDA	1 Jul 2001	3 Mar 2009
ACIAR, GRDC	ACA5	Oilseed brassica improvement in China, India and Australia	30 Jun 2002	30 Sept 2009
ARC, DPI VIC, GRDC, SARDI, UA, UM, UQ	ACP00002	Australian Centre for Plant Functional Genomics Phase 2	1 Jan 2008	31 Dec 2012
AEA, DAFF, GRDC	AEA00004	South-eastern Australia Grain and Graze 2 program	31 Jan 2010	31 Dec 2013
AGO, GRDC	AGO00004	AGO contribution towards UM00027 Effect of elevated carbon dioxide on wheat-based production systems under Australian field conditions	1 Jun 2006	30 Jun 2010
AWI, DA, GRDC, MLA, RIRDC	AWR00002	Contribution to Pastures Australia	30 Jun 2006	30 Jun 2010
GRDC, MLA	BAE00017	Australian Agricultural and Grazing Industries Survey and Grains Industry Reports: 2009–10, 2010–11 and 2011–12	30 Jun 2009	30 Jun 2012
BCG, DAFF, GRDC	BWD00018	Northern Victorian Grain and Graze 2 program	31 Jan 2010	31 Dec 2013
BCG, DAFF, GRDC	BWD00019	Australian farm groups demonstrating adaptive practices to minimise the impact of climate change on farm viability	31 May 2010	1 Jun 2012
CRDC, GRDC	CRD00003	Defining critical soil nutrient concentrations in soils supporting grains and cotton in northern NSW and Queensland	30 Jun 2009	30 Jun 2012
CSIRO, DAFF, DAFWA, GRDC, DNRW QLD, DPI NSW, DPI VIC, DPIF QLD, SARDI, UNE, UWA	CSA00019	Soil Carbon Research Program	1 Jun 2009	30 Jun 2012
CSIRO, DAFF, GRDC, UM	CSA00022	Developing climate change resilient cropping and mixed cropping–grazing businesses in Australia	15 Jun 2009	30 Jun 2012
CSIRO, DAFWA, DPIF QLD, GRDC, UQ	CSE00051	Pest suppressive landscapes—linking integrated pest management and natural resource management	30 Jun 2009	30 Jun 2012
AEC, APL, DA, GRDC, MLA, PRC	CSP00118	Australian Feedgrain Partnership sorghum project	1 Oct 2008	30 Sept 2010
BCG, DAFF, DAFWA, DEEDI, DPI VIC	DAF00003	National Adaptation and Mitigation Initiative coordination project	31 May 2010	1 Jun 2012
AWI, DPI NSW, GRDC	DAN00097	National independent quality assurance and germplasm maintenance for *Rhizobium* inoculants	1 Jul 2005	31 Dec 2010
CRDC, DPI NSW, GRDC	DAN00121	Helicoverpa insecticide resistance: monitoring, mechanisms and management 2	1 Jul 2008	30 Jun 2011

R&D partners	Number	Title	Start date	Finish date
GRDC, SRDC	DAQ00129	Improving the integration of legumes in grain and sugarcane farming systems in southern Queensland	1 Jul 2008	30 Jun 2012
CRDC, GRDC	DAQ00130	Management of tobacco streak virus in sunflower and pulse crops	1 Jul 2008	30 Jun 2011
DPI NSW, DPIF QLD, GRDC	DAQ00136	Risk assessment and preventive strategies for herbicide resistance in the Northern Region, Phase 3	1 Jul 2008	30 Jun 2011
CRDC, DPIF QLD, GRDC	DAQ00148	Defining critical soil nutrient concentrations in soils supporting grains and cotton in northern NSW and Queensland	30 Jun 2009	30 June 2012
DAFF, DEEDI, GRDC	DAQ00162	Grain and Graze 2—Northern Region	1 Apr 2010	31 Dec 2013
DAFF, DEEDI, GRDC	DAQ00163	Participatory adaptation and mitigation strategies for climate change on the mixed farms of north-eastern Australia	31 May 2010	1 Jun 2012
CU, GRDC, HAL, SARDI, UA, UM	DAS00094	Diamondback moth (*Plutella xylostella*) control and insecticide resistance management	1 Mar 2009	30 Jun 2012
DAFF, DPI VIC, GRDC	DAV00096	Decreasing nitrous oxide emissions in high-rainfall cropping systems	30 Jun 2009	30 Dec 2012
DA, DAFF, DPI VIC, GRDC	DAV00097	The potential of inhibitors for the mitigation of nitrous oxide emissions from animal production systems, in south-eastern Australia	1 May 2009	30 Jun 2012
DAFF, DPI VIC, GRDC	DAV00108	Demonstrating climate change mitigation and adaptation options through linked and integrated cropping farms in Victoria	31 May 2010	1 Jun 2012
DAFF, DAFWA, GRDC	DAW00202	Demonstrating adaptation to climate change in the wheat belt of Western Australia through innovative on-farm and virtual farm approaches	31 May 2010	1 Jun 2012
DRDC, GRDC	DRD00002	Improving the utilisation of red wheat by lactating dairy cows	1 Jan 2009	1 Jan 2012
DAFF, FG, GRDC	FGI00007	Grain and Graze 2—WA region	1 Apr 2010	31 Dec 2013
DAFF, FR, GRDC	FLR00006	Grain and Graze 2—Building resilient mixed farming systems in southern NSW	1 Apr 2010	31 Dec 2013
GRDC, HAL	HAL00002	Managing Climate Variability—critical thresholds—Horticulture Australia	01 Jul 2009	30 Jun 2011
GRDC, LWA	LWR00005	Annual contribution to AANRO	01 Jul 2008	30 Jun 2010
GRDC, LWA	LWR00006	Contribution to Managing Climate Variability Program Phase 2	01 Jul 2007	30 Jun 2010
GRDC, LWA	LWR00007	Contribution to National Program for Sustainable Irrigation	01 Jul 2007	30 Jun 2011
CSIRO, DA, GRDC, HAL, MLA, RIRDC, SRDC	MCV00001	Managing Climate Variability Program	01 Jul 2009	30 Jun 2013
BOM, DA, GRDC, HAL, MLA, RIRDC, SRDC	MCV00002	Improving seasonal forecasts for south-western WA	01 Jul 2008	30 Jun 2011

R&D partners	Number	Title	Start date	Finish date
BOM, DA, GRDC, HAL, MLA, RIRDC, SRDC	MCV00003	Critical thresholds and climate change impacts/ adaptation in horticulture	01 Jul 2008	30 Jun 2011
BOM, DA, GRDC, HAL, MLA, RIRDC, SRDC	MCV00004	Climate change and variability—assessing regional impacts of sugar cane production	01 Jul 2008	30 Jun 2010
BOM, DA, GRDC, HAL, MLA, RIRDC, SRDC	MCV00005	Extremes, climate modes and reanalysis	01 Jul 2008	30 Jun 2010
BOM, DA, GRDC, HAL, MLA, RIRDC, SRDC	MCV00006	Assessing and managing heat stress in cereals	01 Jul 2008	30 Jun 2013
BOM, DA, GRDC, HAL, MLA, RIRDC, SRDC	MCV00007	Teleconnections between climate drivers and regional climate, and model representation of links	31 May 2010	31 May 2013
BOM, DA, GRDC, HAL, MLA, RIRDC, SRDC	MCV00008	Improving forecast accuracy, especially with improved Indian Ocean initialisation	31 May 2010	31 May 2013
BOM, DA, GRDC, HAL, MLA, RIRDC, SRDC	MCV00009	Improving multi-week predictions	1 Oct 2009	30 Sep 2012
BOM, DA, GRDC, HAL, MLA, RIRDC, SRDC	MCV00010	Understanding frost risk in a variable and changing climate	30 Jun 2010	30 Dec 2012
BOM, DA, GRDC, HAL, MLA, RIRDC, SRDC	MCV00011	Completing climate drivers and synoptic features	1 Feb 2010	30 Jun 2010
BOM, DA, GRDC, HAL, MLA, RIRDC, SRDC	MCV00012	Multi-week climate outlook products for Australia	1 Oct 2009	30 Jun 2010
DA, DAFWA, GRDC, HAL, MLA, RIRDC, SRDC	MCV00013	Temperature extremes and cropping in WA	1 Mar 2010	28 Feb 2013
DA, GRDC, HAL, MLA, RIRDC, SRDC	MCV00014	Managing Climate Variability—communication support	1 Jul 2008	30 Jun 2010
DA, GRDC, HAL, MLA, RIRDC, SRDC	MCV00015	Managing Climate Variability—program coordinator	1 Jul 2008	30 Jun 2011
DA, GRDC, HAL, MLA, RIRDC, SRDC	MCV00016	Managing Climate Variability—planned projects	1 Jul 2009	30 Jun 2010
DA, GRDC, HAL, MLA, RIRDC, SRDC	MCV00017	Managing Climate Variability—communication support and administration	1 Jul 2008	30 Jun 2010
DA, GRDC, HAL, MLA, RIRDC, SRDC	MCV00018	Managing Climate Variability—website	1 Jul 2009	30 Jun 2010

R&D partners	Number	Title	Start date	Finish date
DA, GRDC, HAL, MLA, RIRDC, SRDC	MCV00019	Managing Climate Variability—communication products	1 Jul 2008	30 Jun 2010
DA, GRDC, HAL, MLA, RIRDC, SRDC	MCV00020	Managing Climate Variability—program events	1 Jul 2008	30 Jun 2010
DA, GRDC, HAL, MLA, RIRDC, SRDC	MCV00021	Managing Climate Variability—program support and administration	1 Jul 2008	30 Jun 2010
DA, GRDC, HAL, MLA, RIRDC, SRDC	MCV00022	Managing Climate Variability—program officer	1 Jul 2008	30 Jun 2013
DA, GRDC, HAL, MLA, RIRDC, SRDC	MCV00023	Managing Climate Variability—program management committee	1 Jul 2008	30 Jun 2013
DA, GRDC, HAL, MLA, RIRDC, SRDC	MCV00024	Managing Climate Variability—independent chair	1 Jul 2009	30 Jun 2013
DA, GRDC, HAL, MLA, RIRDC, SRDC	MCV00025	Managing Climate Variability—planned projects: provision for coordinator out-years	1 Jul 2008	30 Jun 2011
DA, GRDC, HAL, MLA, RIRDC, SRDC	MCV00026	Managing Climate Variability—Landcare Australia funds	1 Jul 2009	30 Jun 2010
DA, GRDC, HAL, MLA, RIRDC, SRDC	MCV00027	Managing Climate Variability—monitoring and evaluation: planned projects	1 Jul 2009	30 Jun 2010
GRDC, MLA	MLA00002-2	Eyre Peninsula grazing cereals roadshow	01 Jun 2010	30 Aug 2010
ANU, CSIRO, DEST, GRDC, UNSW, UQ, UWA	NYS00001	Conference Sponsorship—National Youth Science Forum	01 Jun 2007	30 Jun 2010
APL, CSIRO, DPI NSW, DPI VIC, GRDC, MLA, RIRDC, SARDI, UNE, US	PCL00002	Enhancement of NIR calibrations for predicting the energy value of weather-damaged grains for pigs	1 Sept 2006	30 Jun 2010
DPIF QLD, GRDC, PRC, UQ	PCL00003	Sorghum lines with enhanced starch availability for pigs and ethanol production	1 Jan 2007	30 Oct 2010
GRDC, MLA	PDR00001	Development of a business plan for the joint GRDC–MLA mixed farming systems	1 Jul 2008	30 Aug 2009
DAFF, GRDC, QUT	QUT00002	Integrated data and synthesis framework for reducing nitrous oxide emissions from Australian agricultural soils	1 Mar 2009	28 Feb 2012
DAFF, GRDC, QUT	QUT00003	Reducing nitrous oxide emissions in irrigated grains–cotton farming systems	1 Mar 2009	28 Feb 2012
GRDC, RIRDC	RDC00004	GRDC contribution to Collaborative Partnership for Farming and Fishing Health and Safety	01 Jun 2008	30 Jun 2010
GRDC, RIRDC	RDC00006	Investing in Youth initiative	01 Jan 2010	31 Dec 2013

R&D partners	Number	Title	Start date	Finish date
DAFF, GRDC, SFS	SFS00020	Southern Victorian Grain and Graze 2 program	31 Jan 2010	31 Dec 2013
GRDC, SRDC	SRD00002	Contribution to DAQ00129 Improving the integration of legumes in grain and sugar	01 Jun 2008	30 Jun 2012
GRDC, SRDC	SRD00003	Reducing nitrous oxide emissions from sugarcane lands	15 Mar 2009	30 Jun 2012
DAFF, GRDC, UA	UA00117	Eyre Peninsula Grain and Graze 2	31 Mar 2010	31 Dec 2013
AGO, GRDC, UM	UM00027	Effect of elevated carbon dioxide on wheat-based production systems under Australian field conditions	1 Jun 2006	30 Jun 2010
DAFF, GRDC, UM	UM00037	Enhanced efficiency fertilisers as mitigation tools for reducing greenhouse gas emissions from intensive agricultural systems in Australia	15 Jun 2009	30 Jun 2012
DAFF, DPI NSW, GRDC, UNE	UNE00012	Mitigating nitrous oxide emissions from soils using pulses and improved nitrogen management	1 May 2009	30 Apr 2012
GRDC, UT, UWA	UT00019	Primary Industry Centre for Science Education, Phase 3	30 Jun 2009	30 Jun 2012
DAFF, GRDC, UWA	UWA00131	Fertiliser management strategies for decreasing on-farm greenhouse gas emissions	1 Mar 2009	28 Dec 2012

AANRO = Australian Agriculture and Natural Resources Online, ACIAR = Australian Centre for International Agricultural Research, AEA = Ag Excellence Alliance, AEC = Australian Egg Corporation, AGO = Australian Greenhouse Office (now Department of Climate Change and Energy Efficiency), ANU = Australian National University, APL = Australian Pork Ltd, ARC = Australian Research Council, AWI = Australian Wool Innovation Ltd, BCG = Birchip Cropping Group, BOM = Bureau of Meteorology, CRDC = Cotton Research and Development Corporation, CU = Cornell University, DA = Dairy Australia, DAFF = Department of Agriculture, Fisheries and Forestry, DAFWA = Department of Agriculture and Food, Western Australia, DEEDI = Department of Employment, Economic Development and Innovation, Queensland, DEST = Department of Education, Science and Training, DNRW QLD = Department of Natural Resources and Water, Queensland, DPI VIC = Department of Primary Industries, Victoria, DPI NSW = Department of Primary Industries, New South Wales, DPIF QLD = Department of Primary Industries and Fisheries, Queensland, FG = Facey Group, FR = FarmLink Research, HAL = Horticulture Australia Ltd, ICARDA = International Center for Agricultural Research in the Dry Areas, LWA = Land and Water Australia, MLA = Meat and Livestock Australia, PRC = Pork CRC Ltd, QUT = Queensland University of Technology, RIRDC = Rural Industries Research and Development Corporation, SARDI = South Australian Research and Development Institute, SFS = Southern Farming Systems, SRDC = Sugar Research and Development Corporation, UM = University of Melbourne, UNE = University of New England, UNSW = University of New South Wales, UQ = University of Queensland, US = University of Sydney, UT = University of Tasmania, UWA = University of Western Australia

Appendix D: 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 free of charge (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 at www.grdc.com.au.

The GRDC's website also provides a catalogue of GRDC publications and an online bookshop. On average, the GRDC's website received approximately 1,025,120 hits per month in 2009–10. The bookshop received approximately 2,730 hits per month.

Most of the GRDC's 2009–10 reports and publications are publicly available. Key publications released in 2009–10 are listed below.

New publications available free of charge in 2009–10

Information for grain growers		
Booklets	*Understanding Australian Grain Quality* *Double Cropping in Northern Victoria* *Canola Best Practice Management Guide for South-eastern Australia* *2010 National Variety Trials Queensland Wheat Varieties* *2010 South Australian Crop Harvest Report* *2010 South Australian Farm Gross Margins*	
Fact sheets	**National**	Fungicide Timing Dual Purpose Crops Canopy Management Wheat Curl Mite Green Bridge Integrated Pest Management Deep Ripping Carbon Farming Strategic Risk Management Rotations Targeted Nutrition at Sowing Precision Agriculture Herbicide Resistance Wheat Breeding Managing the Weed Seedbank Root Disease—Pythium Mouse Management Recycled Organic Fertiliser
	Northern Region	Plant Parasitic Nematodes Water Use Efficiency Sunflower Disease Managing Leaf Diseases in Peanuts Soybean Leaf Rust Disease
	Southern and Western regions	Plant Parasitic Nematodes Water Use Efficiency
	Northern and Southern regions	Stored Grain Pests

New publications available free of charge in 2009–10 *(continued)*	
Information for grain growers *(continued)*	
Identification guides	*Beneficial Insects: The Back Pocket Guide* (Southern and Western regions)
Tools	Paddock Diary 2010 (Northern and Southern regions) Grains Research Updates 2010 DVD Information packages: • www.grdc.com.au/pestlinks • www.grdc.com.au/rustlinks • www.grdc.com.au/weedlinks • www.grdc.com.au/biosecuritylinks
Information for technical advisers	
Update Newsletter	Issues 50, 51, 52, 53, 54, 55 (Northern Region) Issues 60, 61, 62, 63, 64, 65 (Southern Region)
Information for all users	
Audio CDs	Driving Agronomy 2010 Audio CD (three versions: Northern Region, Southern Region and Western Region)
Corporate publications	GRDC Annual Report 2008–09 GRDC Growers' Report 2008–09 GRDC Stakeholder Report 2010–11 Ground Cover Direct publications catalogue: • November 2009 – April 2010 • May – October 2010
Ground Cover* and *Ground Cover Supplements	Six issues of the newspaper, all with supplements: • Issue 81—Variety Specific Agronomy • Issue 82—Water Use Efficiency • Issue 83—Wheat Breeding • Issue 84—Pulse Breeding • Issue 85—Oilseed Breeding • Issue 86—RDCs Working Together
Research reports	*The Current and Potential Costs from Diseases of Barley in Australia* *The Current and Potential Costs from Diseases in Wheat in Australia* *Raising the Bar with Better Soybean Agronomy—Summer 2010* *Raising the Bar with Better Safflower Agronomy—Autumn 2009* *Adoption of No-till Cropping Practices in Australian Grain-growing Regions* *Review of Livestock Impacts on No-Till Systems* *Disc Seeding in Zero-till Farming Systems—A Review of Technology and Paddock Issues*

New publications available for sale in 2009–10	
Booklets	*Grain Yearbook 2010*
Ute guides	*Faba Beans: The Ute Guide* *Vetch: The Ute Guide* *Weeds: The Ute Guide (Version 2—Southern Region)*

References

Mouldboard ploughing trials in WA. *Photo: Stephen Davies*

Abbreviations list

AAGIS	*Australian Agricultural and Grazing Industries Survey*
ABARE	Australian Bureau of Agricultural and Resource Economics
ACIAR	Australian Centre for International Agricultural Research
AGT	Australian Grain Technologies Pty Ltd
AWI	Australian Wool Innovation
BBA	Barley Breeding Australia
CAC Act	*Commonwealth Authorities and Companies Act 1997*
CAIGE	CIMMYT–Australian–ICARDA Germplasm Evaluation
CIMMYT	International Maize and Wheat Improvement Center
CRC NPB	Cooperative Research Centre for National Plant Biosecurity
CRDC	Cotton Research and Development Corporation
CRM	customer relationship management
DA	Dairy Australia
DPIF Qld	Department of Primary Industries and Fisheries, Queensland
EMT	Executive Management Team
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999*
EPR	end point royalty
FOI Act	*Freedom of Information Act 1982*
GCA	Grains Council of Australia
GM	genetically modified
Go Grains	Go Grains Health & Nutrition Limited
GOA	Grain Orana Alliance Incorporated
GRDC	Grains Research and Development Corporation
GWIS	Global Wheat Information System
HSMAs	Health and Safety Management Arrangements
HWSD	Harrington Weed Seed Destructor
ICARDA	International Center for Agricultural Research in the Dry Areas
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IPM	integrated pest management
IR	infrared
IT	information technology
KPIs	key performance indicators
LWA	Land and Water Australia
MLA	Meat and Livestock Australia
NGA	Northern Grower Alliance
NIPI	National Invertebrate Pest Initiative
NPSI	National Program for Sustainable Irrigation
NVT	National Variety Trials
OH&S	occupational health and safety

PBA	Pulse Breeding Australia
PBR	plant breeder's rights
PIERD Act	*Primary Industries and Energy Research and Development Act 1989*
PPO	polyphenol oxidase
R&D	research and development
RD&E	research, development and extension
RDCs	rural R&D corporations
RIRDC	Rural Industries Research and Development Corporation
SPAA	Southern Precision Agriculture Association
SRDC	Sugar Research and Development Corporation
TFP	total factor productivity
VAWCRC	Value Added Wheat Cooperative Research Centre
WSMV	wheat streak mosaic virus

Warwick Holding, Yerong Creek, NSW, has set new benchmarks for water use efficiency (WUE) on his farm, and is now dealing with the consequences of frost. *Photo: Kellie Penfold*

Compliance index

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Other legislative requirements

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Contact details

Location	Level 1, Tourism House 40 Blackall Street BARTON ACT 2600
Postal address	GRDC PO Box 5367 KINGSTON ACT 2604
Contact officer	GRDC Compliance Officer Telephone: 02 6166 4500 Facsimile: 02 6166 4599 Website: www.grdc.com.au

GRDC
Grains Research & Development Corporation

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FS 554590

Delivery dates

Submission of financial statements to the GRDC Finance, Risk and Audit Committee	6 August 2010
Submission of final draft to the GRDC Board	30 September 2010
Certification of financial statements by the Australian National Audit Office	12 August 2010
Approval of final annual report by the GRDC Board	13 October 2010
Submission to the Minister for Agriculture, Fisheries and Forestry	15 October 2010
Submission to the Australian Government Department of Agriculture, Fisheries and Forestry	15 October 2010
Tabling in parliament	During the spring session
Presentation to Grain Producers Australia	On tabling

Production notes

Compliance editor	Catherine Wells
Photo editor	Maureen Cribb
Program editor	Zoltan Lukacs
Financials	Danielle Jakubowski
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Printing	Goanna Print, Canberra

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BACK COVER PHOTOS

Small Image:
DAFWA field officers Natalie Hogg and Angelo Loi with the new soft yellow serradella (legume). *Photo: Brad Collis*

Large Image:
Precision Agriculture's Andrew Whitlock researching benefits of proximal sensor technology. *Photo: Melissa Branagh-McConachy*

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