



Australian Government

Sugar Research and Development Corporation

ANNUAL OPERATIONAL PLAN 2005.....2006





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Annual Operational Plan 2005–2006

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CONTENTS

	Page No
1. INTRODUCTION	1
2. CORPORATE GOVERNANCE	3
2.1 Enabling Legislation and Legislative Objectives	3
2.2 Objectives of SRDC	3
2.3 Industry Representative Organisations	3
2.4 Responsible Minister	4
2.5 Corporate Governance Framework	4
3. OPERATING ENVIRONMENT	6
3.1 R&D Environment	6
3.2 Stakeholders	7
4. OUTCOMES, OUTPUTS AND RESOURCING	8
4.1 SRDC Outcome	8
4.2 SRDC Outputs	8
4.3 Outcome – Resourcing	9
4.4 Allocation of Resources among Outputs	9
4.5 Performance Information for Outcome and Outputs	10
4.6 Overview of Programs	11
4.7 Projects or Consultancies undertaken by Representative Bodies	14
5. ADDRESSING TARGETED OUTCOMES AND STAKEHOLDER PRIORITIES	17
5.1 Six Key Outcomes of the SRDC R&D Plan 2003-2008	17
5.2 Australian Government R&D Priorities	17
5.3 Addressing the R&D Plan Outcomes and the Government R&D Priorities	18
ATTACHMENT A PROJECTS AND SCHOLARSHIPS IN 2005–06	32
ATTACHMENT B ORGANISATIONAL IDENTIFIERS IN PROJECT CODES	42
ATTACHMENT C ABBREVIATIONS AND ACRONYMS	43

1. INTRODUCTION

The Sugar Research and Development Corporation (SRDC) is a statutory authority established under the *Primary Industries and Energy Research and Development Act 1989* (the PIERD Act). SRDC's mission is to foster an innovative and sustainable Australian sugar industry through targeted investment in research and development.

Section 25 of the PIERD Act requires SRDC to develop and prepare a written Annual Operational Plan. The Plan is required to set out the broad groupings of eligible activities that the Corporation proposes to fund in the year ahead. The Plan must also describe the extent to which these activities address the Corporation's current Research and Development Plan.

In addition, the Annual Operational Plan should incorporate an outcome/output framework to facilitate performance reporting required by the *Commonwealth Authorities and Companies Act 1997*.

SRDC is a funding body focusing on producing outcomes to benefit the Australian sugar industry and the community. It does not conduct research itself but invests in, and manages, a broad spectrum of research by various research providers, with the goal of maximising stakeholder returns on R&D investment.

The Australian sugar industry produces raw and refined sugar from sugarcane. While on average it produces only 3–4% of the world sugar supply, it exports approximately 8–10% of the sugar traded worldwide. In recent years Australian sugar production has been between 4 and 5 million tonnes per annum, depending on seasonal conditions. The last 5–6 years have been a period of relatively low world sugar prices. The gross value of cane production dropped below \$1 billion in 1999–00 and has since ranged between \$680m and \$970m. It is forecast to be \$925m in 2004–05.

It is the intention of the Australian Government that R&D Corporations should provide leadership and be catalysts for change. They should identify needs and opportunities for R&D, including improvements in the adoption of research results, and exploit opportunities to expand the funding and impact of research.

SRDC's outputs reflect the priorities of industry and government. The outputs of value chain integration, sustainable farming systems, sustainable processing and distribution systems, and building human capacity for change, all contribute to the outcome of a profitable and internationally competitive Australian sugar industry providing economic, environmental and social benefits for rural and regional communities.

R&D Plan 2003–2008

This Annual Operational Plan is the third to be submitted based on the SRDC R&D Plan 2003–2008.

SRDC worked with sugar industry organisations, research providers and government in developing the R&D Plan 2003–2008, which was approved by the Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry on 20 December 2002.

The R&D Plan 2003–2008 was framed within the context of the realities of the state of the industry, while continuing to look to the health and sustainability of the industry in the longer term.

The R&D Plan 2003–2008 gives particular attention to three broad areas — use of an integrated systems approach, improved uptake of existing R&D outputs by the industry, and capacity building to more fully realise the potential of people and partnerships throughout the industry.

The R&D Plan sets out SRDC's Corporate Outcome of *A profitable and internationally competitive Australian sugar industry providing economic, environmental and social benefits for rural and regional communities.*

The R&D Plan also nominates six key outcomes that will be delivered during the period of the Plan to contribute to the Corporate Outcome. These are listed in Section 5.1.

The focus of this Plan is systems-based in order to realise the opportunities available from a consideration of the whole industry value chain. Activities developed under the Plan will use novel, multi-disciplinary tools and technologies that integrate across the industry value chain. They will develop human capacity and associated processes in order to implement more rapid and more radical change across the system as a whole.

2. CORPORATE GOVERNANCE

2.1 *Enabling Legislation and Legislative Objectives*

SRDC was established under the *Primary Industries and Energy Research and Development Act 1989* (the PIERD Act) on 1 October 1990. As an Australian Government Statutory Authority it is also subject to the *Commonwealth Authorities and Companies Act 1997* (the CAC Act).

The objects of the PIERD Act are to make provision for the funding and administration of research and development relating to primary industries with a view to:

- (a) increasing the economic, environmental or social benefits to members of primary industries and to the community in general by improving the production, processing, storage, transport or marketing of the products of primary industries; and
- (b) achieving the sustainable use and sustainable management of natural resources; and
- (c) making more effective use of the resources and skills available in the community in general, and in the scientific community in particular; and
- (d) improving accountability for expenditure upon research and development activities in relation to primary industries.

2.2 *Objectives of SRDC*

The objectives of SRDC are directly related to the objects of the PIERD Act. They are to:

- improve the competitive position and cost efficiency of the Australian sugar industry;
- achieve sustainable use and sustainable management of the natural resource base of the sugar industry;
- apply industry, scientific and community resources more effectively to R&D in the sugar industry; and
- manage SRDC resources efficiently and to improve the accountability for expenditure on R&D for the sugar industry.

2.3 *Industry Representative Organisations*

The PIERD Act prescribes the following representative organisations of SRDC:

- Australian Cane Growers' Council Limited (ACGC)
- Australian Cane Farmers' Association Limited (ACFA)
- Australian Sugar Milling Council Proprietary Limited (ASMC)

SRDC is accountable to both the Australian Government and these representative organisations. SRDC meets formally with the representative organisations at least three times

each year to discuss SRDC activities and statutory reporting, levy arrangements, R&D priorities and any other matters of mutual interest. No payments are to be made to the representative organisations in 2005–06 in relation to these consultations or for any other purpose apart from the conduct of R&D projects (see Section 4.7).

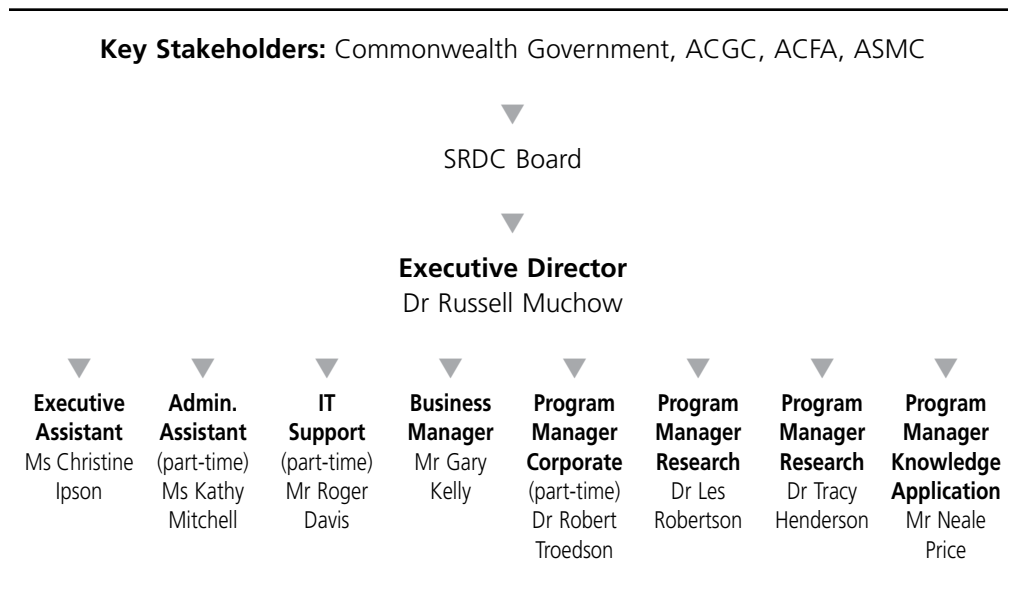
2.4 Responsible Minister — Ministerial power of direction

SRDC is responsible to the Federal Parliament through Senator the Hon. Richard Colbeck, Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry. The Parliamentary Secretary:

- Approves the five-year Research and Development Plan and the Annual Operational Plan
- Appoints Directors of SRDC on the recommendation of the Sugar Research and Development Corporation Selection Committee
- Appoints the Chairperson and Government Director of SRDC.

2.5 Corporate Governance Framework

2.5.1 Corporate Structure



2.5.2 Structures, processes, controls

The SRDC Board sets the Corporation’s strategic direction and delegates responsibility for day to day management to the Executive Director. The Board is committed to governance systems that enhance performance and ensure that SRDC is operating according to accountability provisions of the PIERD Act and the CAC Act. An Audit Committee of two non-executive directors appointed by the Board provides advice to the Board to assist it in fulfilling its responsibilities relating to accounting, reporting and compliance practices of the Corporation.

SRDC reviews its R&D activities and management systems at its July Board meeting each year including a review of progress towards achieving its corporate outputs and outcome. It also considers whether the R&D Plan requires amendment. In addition, it reviews the performance of the Board, and management of SRDC and considers any changes necessary to policies and operating procedures, financial reporting, reporting systems and internal controls. These are detailed in its internally developed Business Process Management System (BPMS) which incorporates SRDC's quality and continuous improvement mechanism. An internal audit of the BPMS is conducted annually and reported to the Audit Committee and the Board.

The Board at its meeting in August 2004 agreed to call for new proposals across all four Programs of the R&D Plan 2003–2008. In August 2004, SRDC advertised nationally for Preliminary Research Project Proposals (PRPP) to commence from 2005–06, as well as Postgraduate Scholarships and Travel and Learning Opportunity Proposals to commence from January 2005, all with a due date of 30 September 2004. Sixty-one PRPPs were received. In October 2004, SRDC convened four Working Parties to consider the PRPPs and provide an assessment to the Board of their attractiveness and feasibility. Members of the Working Parties were drawn from industry, research, marketing and government sectors as well as SRDC Directors and Program Managers. In November, the Board considered the proposals and the Working Parties' assessments and agreed to invite 23 Full Research Project Proposals to be submitted by 14 February 2005. The Board also approved a further call for Travel and Learning Opportunity Proposals, due by 14 February, and 15 were received.

Following consideration of the proposals by the Working Parties and the Board in March 2005, the final portfolio of projects (including continuing projects commenced prior to 2005–06) was consolidated by SRDC for submission to the Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry in this Annual Operational Plan.

3. OPERATING ENVIRONMENT

3.1 R&D Environment

Total funds available for sugar industry R&D in 2004–05 were estimated in October 2004 to be \$49.3 million, of which 35% was contributed by the industry. This total consisted of \$9.3 million provided by SRDC, \$24.6 million from R&D providers including the industry R&D organisations BSES, SRI and Cane Protection and Productivity Boards, and \$15.4 million from other sources including the CRC for Sugar industry Innovation through Biotechnology. These levels of funding are similar to those in 2003–04.

The SRDC R&D Plan 2003–2008 outlines four key challenges that the sugar industry and SRDC in particular are expected to face over the period of the Plan, as follows:

- *Competition and the forces of globalisation*

While Australia is technologically a very efficient sugar producer, competitors have achieved gains in cost efficiency and total revenue by integrating operations across the value chain and creating more value-added opportunities. In addition, Australia is one of the few major sugar exporters which does not have a substantial domestic market for a large proportion of their production. Brazil, in particular, has increased its exports more than ten-fold over the past six years to more than 15 million tonnes (compared with Australia's exports of around 4 million tonnes) and with its low production costs, provides a new benchmark for all countries competing on the international sugar market.

- *Availability of new technologies*

Advances in areas such as Information Technology and Biotechnology may provide the platform for the substantial improvements in profitability required to sustain the industry and ensure its long-term survival.

- *Pressure for environmental sustainability*

Pressure originates from a diversity of sources including world markets, Australian and other national governments, the industry itself, other industries affected by the sugar industry (eg. tourism, fishing) and from the wider community.

- *Expectations of society*

The sugar industry's neighbouring communities are changing with increasing urbanisation along the east coast, resulting in an expectation of greater social responsibility from the industry in areas such as road safety and public amenity.

The Australian sugar industry and its R&D community continue to face the need for change in responding to the international competition that has resulted in a step change downwards in world sugar price. In responding to this challenge, SRDC and R&D providers need to address the economic, environmental and social dimensions of sustainability to secure the industry's future.

3.2 Stakeholders

The stakeholders of SRDC include the growers and millers of the Australian sugar industry, the Australian Government, R&D organisations, agribusiness and the rural and regional communities in sugar-growing areas.

In developing its R&D Plan 2003–2008, SRDC consulted its stakeholders to develop the needs and opportunities for R&D during the five years ahead. It took into account:

- Industry priority issues
- Views of R&D Organisations and Agribusiness
- Australian Government Priorities
- Community issues

In the process of developing the new R&D Plan, SRDC conducted a series of needs analysis workshops followed by a Delphi process to determine the priority needs of the industry. Further workshops were then conducted in all regions of the industry to seek feedback on the draft priorities, strategies and programs of the Plan.

Industry stakeholders determined that the industry's principal priorities or needs are:

- Whole-of-industry profitability through exploitation of opportunities for better integration across the value chain to ensure enhanced revenue and increased cost efficiency.
- An economically, environmentally, and socially sustainable industry that has sustainable farming, harvesting, processing, and distribution systems, and efficient and effective marketing systems for Australian sugar.
- An efficient and effective Research, Development, and Extension capacity that collaborates strongly across R&D providers and with the various components of the industry value chain.
- Attraction and retention of people who are talented, well trained and committed to the sugar industry.

These are reflected in the six key outcomes of the R&D Plan which are discussed in detail in Section 5.

4. OUTCOMES, OUTPUTS AND RESOURCING

4.1 SRDC Outcome

The SRDC Outcome was updated for SRDC R&D Plan 2003–2008 to more explicitly reflect the economic, environmental and social benefits from SRDC funded research and development.

SRDC's outcome is:

A profitable and internationally competitive Australian sugar industry providing economic, environmental and social benefits for rural and regional communities

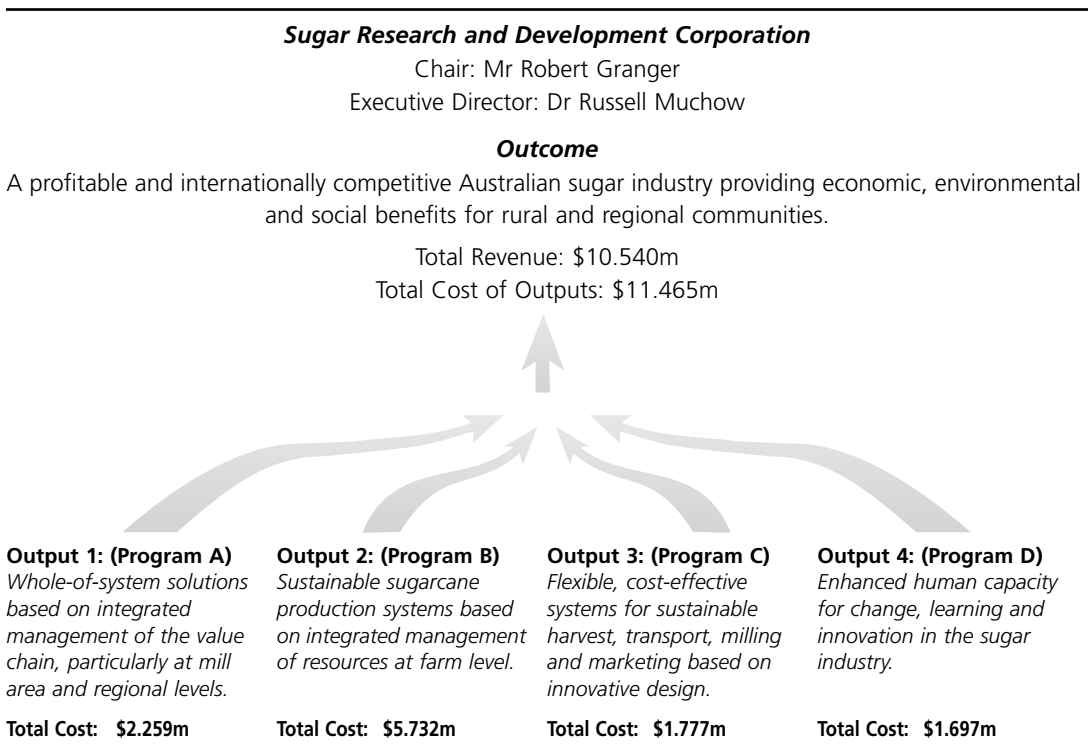
This outcome is consistent with the Agriculture, Fisheries and Forestry portfolio outcome of more sustainable competitive and profitable Australian agricultural, food, fisheries and forestry industries.

The R&D Plan 2003-2008 specifies six key outcomes which together contribute to the Corporate Outcome. The six key outcomes and SRDC's investments to achieve them are described in Section 5.

4.2 SRDC Outputs

The R&D Plan 2003–2008 specifies four outputs which relate to the four Programs of the Plan. Figure 1 shows the contribution of the four outputs to SRDC's overall outcome in 2005–06.

FIGURE 1 — RELATIONSHIP BETWEEN OUTCOMES, OUTPUTS AND INPUTS IN 2005–06



4.3 Outcome — Resourcing

The total revenue for SRDC including industry levies and the Australian Government contribution, and total expenditure for the SRDC outcome are shown in Table 1 and compared with the approved budget for 2004–05.

TABLE 1 SRDC BUDGETS 2004–05 AND 2005–06

	\$m 2004–05	\$m 2005–06
Estimated Crop Size (cane)	38.1 mt	37.5 mt
Levy rate/tonne	\$0.14	\$0.14
INCOME		
Industry Contribution	5.328	5.252
Australian Government PIERD Act Contribution	4.336	4.390
Australian Government FMS Contribution	0.219	0.529
Interest / Other	0.410	0.370
TOTAL INCOME	10.293	10.541
EXPENDITURE		
Continuing Projects	5.066	6.157
New Projects	3.061	3.605
TOTAL PROJECTS	8.127	9.761
Operation of SRDC	1.537	1.659
Capital	0.015	0.045
TOTAL EXPENDITURE	9.679	11.465

4.4 Allocation of Resources among Outputs

The R&D Plan 2003–2008 provides a target allocation of resources between Programs. Table 2 compares the proposed allocation for 2005–06 to the target allocation. The proposed allocations in 2005–06 are within the target ranges in all Programs.

TABLE 2 TARGET ALLOCATION OF RESOURCES ACROSS PROGRAMS AND PROPOSED ALLOCATION FOR 2005–06

Program (Output)	Target Allocation	Total Funding	Allocation
	in R&D Plan (%)	2005–06 (\$m)	2005–06 (%)
A (1) Value Chain Integration	20–25	2.259	20
B (2) Farming Systems	45–50	5.732	50
C (3) Processing and Distribution Systems	15–20	1.777	15
D (4) Industry Capacity	10–15	1.697	15
Total		11.465	100

4.5 Performance Information for Outcome and Outputs

The effectiveness of SRDC's R&D programs in achieving its overall outcome is assessed by the indicators given in Table 3.

TABLE 3 PERFORMANCE INDICATORS AND MEASURES FOR THE EFFECTIVENESS OF SRDC'S ACTIVITIES IN ACHIEVING ITS OUTCOME

Performance information for SRDC Outcome — Effectiveness	
Indicator	Measure
1. Economic returns from SRDC investments	1(a) Investment analyses of completed R&D projects demonstrate a benefit:cost ratio greater than 5:1 1(b) Adoption rates benchmarked for at least three technologies per year
2. Environmental returns from a better understanding of environmental management issues, and a reduction of adverse impacts on the industry's production environment and other ecosystems	2. Case studies demonstrating improved natural resource management and reduced environmental impacts in quantitative and/or qualitative terms
3. Societal returns from investment in industry and public health and safety; human resource capacity and capability; and R&D with significant community benefits	3(a) Case studies demonstrating improved health and safety 3(b) Completion of at least two tertiary scholarships and two study tours or conference attendances by industry R&D personnel per year 3(c) The number of producers involved in participative action research increasing each year 3(d) The proportion of total SRDC funding that contributes benefits beyond the sugar industry exceeds 30% 3(e) The proportion of total SRDC funding that contributes significant benefits to rural and regional communities exceeds 20%
4. Alignment of SRDC's priorities and plans with those of the Australian sugar industry and the Australian Government	4. Outputs produced in all sugar industry and government priority areas
5. Compliance with statutory obligations	5. Submission of statutory documents on time and meeting all requirements, as measured by acceptance by the Minister

Performance Information for SRDC's four Outputs in 2005–06 is presented in Table 4.

TABLE 4 PERFORMANCE INFORMATION FOR SRDC OUTPUTS

Output	Indicator and Measure
<i>Common to Outputs 1, 2, 3 & 4</i>	<p><i>Quality:</i></p> <ul style="list-style-type: none"> • Accountability to SRDC of its research providers through monitoring project milestones, financial reporting requirements and reviews to ensure delivery of output • At least one review completed in each Output.
<i>Specific to individual outputs</i>	
<i>Output 1 — Whole-of-system solutions based on integrated management of the value chain, particularly at mill area and regional levels</i>	<i>Quantity:</i> 14 continuing projects and 4 new projects or project groups
<i>Output 2 — Sustainable sugarcane production systems based on integrated management of resources at farm level.</i>	<i>Quantity:</i> 27 continuing projects and 8 new projects or project groups
<i>Output 3 — Flexible, cost-effective systems for sustainable harvest, transport, milling and marketing based on innovative design.</i>	<i>Quantity:</i> 13 continuing projects and 4 new projects or project groups
<i>Output 4 — Enhanced human capacity for change, learning and innovation in the sugar industry.</i>	<i>Quantity:</i> 34 continuing projects and 18 new projects or project groups, and 4 new and 9 continuing scholarships

4.6 Overview of Programs

The R&D Plan 2003–2008 includes four R&D Programs which are described below. Details of R&D activities in the four Programs are provided in Section 5, which describes their relationship to the six Key Outcomes of the R&D Plan and to the National and Rural R&D Priorities of the Australian Government. Attachment A provides a listing of continuing and new projects or project groups that were approved at the time of preparation of the AOP. Additional projects, within the budget amounts proposed in Section 4, may be approved subsequently.

Program A Value Chain Integration

This Program is concerned with adding value by making the value chain work better. Significant opportunities exist to optimise the use of whole-of-system resources by exploiting linkages and inter-dependencies across the industry value chain. Optimum solutions need to underpin not only the economic viability of the industry but also its environmental and social sustainability. Particular emphasis will be placed on a whole-of-system approach to harvest and transport, leading to enhanced revenue and cost efficiency.

Outcome

Increased efficiency and overall profitability of the industry as an integral part of sustainable regional development

Output

Whole-of-system solutions based on integrated management of the value chain, particularly at mill area and regional levels

Activities in 2005–06

Projects to be funded in 2005–06 will target regional and cross-sector decision-making. Several initiatives target the harvest and transport interface to achieve whole-of-system gains in revenue and cost efficiency coupled to piloting processes for participative implementation of change. Market signals are being assessed to develop options for improved harvest payment systems which will promote adoption of harvesting best practice. A whole-of-industry predictive modelling capacity is being developed to assist industry to explore alternative cost-effective production systems. Improvements are being sought to yield forecasting to enhance marketing strategies for the sugar industry, which will contribute to another initiative to develop methods for industry-wide implementation of new technologies. Five projects will support partnerships and planning to enhance socio-economic and environmental performance at specific regional and mill area levels.

Program B Farming Systems

Sugarcane productivity is essential for the viability of growing, harvest, transport and milling enterprises. Significant opportunities exist to seek improvement based on skilful management of resources (eg. varieties, soil, water, nutrients, pest management inputs, capital and labour) given the variable influences of climate, pest and disease incursion and incidence, repair of soil degradation, cost/price structures and social structures. A systems approach to farming and the development of novel pathways for implementation of more sustainable practices based on participative action research will be vital to achieving profitable, safe and environmentally responsible farming practices.

Outcome

Robust production systems that are both profitable and in harmony with the environment and societal expectations

Output

Sustainable sugarcane production systems based on integrated management of resources at farm level

Activities in 2005–06

Integrated solutions to underpin sustainable farming systems will be sought through the development and promotion of practices to restore soil health, foster integrated pest management and develop more sustainable irrigation and fertiliser management practices. These projects will also target improvements in the quality of water leaving farmlands. Several projects will focus on practice change to implement improved farming systems. SRDC will also

invest in sugarcane plant improvement, through the CRC for Sugar Industry Innovation through Biotechnology, and through projects to develop improved varieties with pest and disease resistance and improved sugar content, through both conventional and biotechnology approaches.

Program C Processing and Distribution Systems

Technological advance is critical for more efficient processing and distribution systems, but implementation of advanced technologies is conditional on better utilisation of capital and the development of innovative products.

Opportunities exist to improve the design and implementation of harvest, transport, milling and marketing processes consistent with environmental and societal responsibility. These will lead to better utilisation of capital, greater cost efficiency, enhanced product recovery, expanded product range and enhanced product quality.

New opportunities in diversification to broaden the income stream warrant investment commensurate with risk. Investment should be targeted at expanding the product range and exploring opportunities for extraction of novel biomaterials from modified sugarcane varieties.

Outcome

More productive and cost-effective processing and distribution systems in harmony with the environment and societal expectations

Output

Flexible, cost-effective systems for sustainable harvest, transport, milling and marketing based on innovative design

Activities in 2005–06

Projects funded in 2005–06 aim to develop innovative technologies and best management practices for harvesting and milling processes. These include improved harvester design, reduced factory maintenance costs and improved evaporation and crystallisation processes in raw sugar factories. Diversification of the income stream will be expanded through initiatives aimed at improving cogeneration of electricity through improved drying of trash and bagasse and other sources of increased energy efficiency. As well, extraction of natural products from sugarcane, and extraction and fermentation technologies which can lead to improved processes for production of new products including food and fibre products, and feedstocks such as ethanol, will be investigated.

Program D Industry Capacity

This program is concerned with adding value through more fully realising the potential of people throughout the industry. To realise the opportunities arising from innovative R&D, it is important to enhance human skills to address the challenges of the increasingly complex operating environment of the Australian sugar industry. Investing in people and fostering alliances, partnerships and collaborations will be critical to success in integrating system solutions that contribute to a vibrant sugar industry.

Outcome

A skilled human resource base and enhanced industry R&D capacity focussed on delivery of economic, environmental and societal benefits

Output

Enhanced human capacity for change, learning and innovation in the sugar industry

Activities in 2005–06

Projects to enhance people's capacity to learn and change in 2005–06 include the development of corporate governance skills in rural women and the ongoing development of industry leadership skills through Continuous Improvement and Innovation workshops, the Industry Capacity Building Program in partnership with CSR Sugar, and the leading industries program. In addition, SRDC will fund 13 postgraduate scholarships at a number of Australian universities, and continue to support the joint RDC programs in Farm Occupational Health and Safety and Human Capacity Development. SRDC will also participate in the Innovator of the Year Award (with Queensland Sugar Limited) and will offer the SRDC Research/Extension and Service to Industry R&D Awards. SRDC has initiated Excellence in Grower Group Awards and Grower Group Innovation Projects. SRDC will participate with the Department of Agriculture, Fisheries and Forestry in offering sugar industry awards in both the *Science and Innovation Awards for Young People in Agriculture, Fisheries and Forestry* and the *Corporate Governance for Rural Women Initiative*.

SRDC has approved 27 Travel and Learning Opportunity Projects (TLOPs) which will enable industry, research and extension staff to visit other regions or industries or national and international conferences. These projects provide people with the opportunity to learn new and improved approaches to commercial or R&D activities through observing and discussing the work of others. Further TLOPs will be funded based on a call for TLOP proposals due 31 May 2005.

4.7 Projects or Consultancies undertaken by Representative Bodies

The *1998 Consultation Guidelines* require that Annual Operational Plans outline the details of the overall nature, purpose and expected outcome of projects or consultancies undertaken by representative industry organisations.

In 2005–06, regional offices of the Australian Cane Growers' Council will act as administering organisations for four research projects and five travel and learning projects, as listed in the following paragraphs. Apart from these projects, no funding of representative industry organisations is proposed.

Project CG007, *The Tully Sugar Industry Project — "Working together for our Future" Phase 2*, will be administered by Tully Canegrowers and conducted in partnership with researchers from Tully Sugar Limited, Tully Cane Productivity Services Ltd, and BSES Limited. The project will continue to develop and implement the strategic plan for the Tully sugar industry. Critical Success Factors, Key Performance Indicators and Key Practices have been identified. Vision Action Teams have been formed to develop and implement plans to achieve these opportunities. The Vision project focuses on productivity issues at the individual farm and

harvester level and fits within a wider Strategic Plan of the Tully Sugar industry which is addressing the need for improved profitability and sustainability.

Project CG008, *Targeted Planning for Profit: A grass roots program to build grower skills to manage change and implement integrated future planning*, will be administered by Isis Canegrowers and conducted in partnership with researchers from Isis Central Sugar Mill, Isis Productivity Ltd, BSES Limited and QDPI. The project aims to improve the economic, social and environmental performance of 70 cane farming businesses in the Isis cane supply area by building the capacity of these 70 growers, and their families, to cope with and adapt to change and fostering their ability to implement improved business planning and management skills. Activities include workshops on change & action learning, goal setting and continuous improvement, and business planning and performance monitoring. Industry advisors mentor growers to examine their farm and business performance and set goals for regular performance monitoring and continuous improvement, using principles presented in the workshops.

Project CG009, *Investigating opportunities for a grain and legume industry in a coastal sugarcane cropping regime*, will be administered by Isis Canegrowers conducted in partnership with researchers from BSES Limited and QDPI. The project will conduct a feasibility study to investigate a new industry focused on new or novel grain legume crops, and existing break crops such as soybeans, peanuts and chickpeas, in a coastal sugar cane cropping regime. A desk-top analysis will assess agronomic suitability, marketing and economic potential. Industry ownership of the study and its outcomes will allow well-informed and strategic grower and industry investment in new cropping opportunities that complement a robust cane industry.

Project CG013, *Growers working together to improve water quality in the Herbert sugar industry*, will be administered by Herbert Canegrowers and conducted in partnership with researchers from CSR Sugar Ltd and BSES Limited. The project will establish grower-participatory water quality monitoring in up to five representative sugarcane sub-catchments within the Herbert, and establish rapid feedback processes among growers for the results. The project aims to validate recommended practices and risk management procedures, developed in project BSS268, for minimising off-site nutrient movement for the soil types in the focus sub-catchments, and increase awareness of the relationship between land management practices and water quality.

Project CG010, *Field trip to the Emerald cotton farming region to inform cane growers & professionals with regard to Farm Management Systems (FMS)*, will be administered by Mackay Canegrowers. Approximately 30 growers from the Central region FMS pilot group will travel to Emerald to meet with cotton industry representatives and DNRM personnel to examine FMS in cotton, Integrated Area-Wide Management, and visit cotton farms to see FMS in action.

Project CG011, *A Changing Future:— Enhancing grower skills and confidence to respond to industry restructure in the Isis and Maryborough Districts*, will be administered by Isis Canegrowers. A group of 80 sugarcane producers and eight industry staff from the Isis and Maryborough districts will tour the Capricornia and Burnett regions to build growers' capacity to embrace change by exploring innovative practices and methods adopted by established and emerging industries, with special attention to cooperative farming systems and cost cutting measures. The project will promote growers' confidence and knowledge in adopting novel

sustainable farming practices and promoting the acceptance of environmental custodianship. The travel will also promote and foster the involvement and participation of women in the industry.

Project CG012, *A review of voluntary, market based & statutory based instruments used in conjunction with the farming community in Chesapeake Bay catchment, USA*, will be administered by Brisbane Canegrowers. Two participants will visit the Chesapeake Bay in North Eastern USA to examine means used to improve off-farm runoff from agriculture. This catchment has successfully reversed poor water quality as a result of runoff from agricultural and urban activities. This will assist the investigation of voluntary, market based and statutory instruments for managing agricultural activities known to be impacting on water quality in the Great Barrier Reef (GBR), as required by the GBR Water Quality Protection Plan.

Project CG014, *Enhancing the Isis women in sugar groups knowledge and capacity to address industry issues*, will be administered by Isis Canegrowers. Members of the Isis Women in Sugar Group will travel to Woodford and Brisbane to meet with leaders of sugar industry marketing, research and representative organisations to discuss innovative developments and highlight the plight of women in industry. A dinner with the local Member of Parliament will highlight the action learning cycle by giving the women an opportunity to communicate their interpretation of their findings.

Project CG015, *Investigating Grain in Cane enterprises*, will be administered by Bundaberg Canegrowers. Around 30 growers from the Grain in Cane project in the Bundaberg area will travel to NSW to study sustainable cane farming systems, including the adoption of minimum till and controlled traffic farming systems with a legume break crop; diversification of income to be not solely reliant on sugar; the use of cane machinery to harvest and transport soybeans to have better use of existing capital; and storage facilities for grain crops to help manage risk.

5. ADDRESSING TARGETED OUTCOMES AND STAKEHOLDER PRIORITIES IN THE SRDC R&D PORTFOLIO

5.1 *Six Key Outcomes of the SRDC R&D Plan 2003–2008*

The R&D Plan 2003–2008 aims to deliver six Key Outcomes through partnerships between SRDC and its stakeholders. They are:

- *An increasing and more reliable cane supply*, primarily through the implementation of robust farming systems that enhance economic and environmental performance, and are less vulnerable to the impacts of adverse factors such as disease and climate variability
- *Facilitation of change* which promotes adoption of whole-of-system solutions to *enhance revenue and cost efficiency across the value chain* at mill area and regional levels
- *Demonstration of environmental sustainability* to the satisfaction of all stakeholders
- *Diversification of the income stream* from products derived from sugarcane
- *Enhancement of human capacity and partnerships* between industry, research and regional communities to underpin change, learning and innovation
- *An effective R&D capability* underpinning industry futures.

5.2 *Australian Government R&D Priorities*

The Prime Minister launched the National Research Priorities on 5 December 2002 under four broad headings:

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

The Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry advised the Government's new priorities for rural research and development on 19 March 2003. The Rural R&D Priorities are framed within the National Research Priorities but give a focus on issues relevant to rural industries. They are:

- Sustainable natural resource management
- Improving competitiveness through a whole-of-industry approach
- Maintaining and improving confidence in the integrity of Australian agricultural, food fish and forestry products
- Improved trade and market access
- Use of frontier technologies
- Protecting Australia from invasive diseases and pests
- Creating an innovative culture

5.3 Addressing the R&D Plan Outcomes and the Government R&D Priorities

This section outlines SRDC's planned investment activities in 2005–06. The six Key Outcomes of the SRDC R&D Plan provide the framework for an integrated description of how the investments address both the six Key Outcomes and the Australian Government's National and Rural R&D priorities.

Outcome 1: An increasing and more reliable cane supply, primarily through the implementation of robust farming systems that enhance economic and environmental performance, and are less vulnerable to the impacts of adverse factors such as disease and climate variability

Enhancing cane supply is one of the keys to profitability in the sugar industry through maximising returns per unit of costs. Narrowing margins due to lower prices, poor growing conditions and alternative land uses necessitate innovation to improve cost-efficiency and profitability. Whilst acknowledging the economic imperatives, farming practices also need to minimise impacts on the environment and other ecosystems. Several elements (including varieties, water and nutrient inputs, pest management and timely operations) must be integrated into a workable and robust package. Systems thinking and a focus on the implementation of changed practice are therefore critical to success.

A significant proportion of SRDC's investments, particularly in Program B, are directed towards this outcome. Investments that focus on sustainable water and nutrient management in sugarcane farming systems address both economic and environmental outcomes. For ease of presentation they will be discussed under Outcome 3, which focuses on environmental sustainability. In practice SRDC views all aspects of farming systems R&D as elements that must be integrated into the whole, and all address the **National R&D Priority of An environmentally sustainable Australia** and the complementary **Rural R&D Priority of Sustainable natural resource management**.

SRDC's major farming systems investment over the last 12 years has been through the Sugar Yield Decline Joint Venture (SYDJV). The SYDJV has designed and verified the benefits of an improved farming system based on minimum tillage, controlled traffic, trash blanketing and legume rotation crops. The farming system delivers consistently higher yields across the crop cycle through improved soil health, coupled with lower fertiliser, labour and machinery costs. The SYDJV will conclude in June 2006 but its work in 2005–06 will be confined to detailed analysis and formal publication of R&D findings. Responsibility for ongoing R&D, including several large farming systems demonstration trials, will pass to a new Improved Sugarcane Farming Systems project commencing in July 2005 for three years. Key research issues include nitrogen dynamics, nutrient stratification, interface issues between cane and fallow crops, water infiltration and efficiency of use, indicators of soil biological health including free living nematodes, and machinery development. The new project will also play a role in coordinating several related initiatives, including SRDC projects described in the following paragraphs, and the QDPI and BSES-funded Future Cane project which seeks to promote adoption of the improved farming systems developed by the SYDJV.

A related continuing project will assist groups of growers in the Central district to cooperatively develop the new farming system to suit local conditions, and demonstrate economic and

environmental benefits. A project in the Southern district will investigate the viability of establishing a new grain legume industry using either current crops (soybean, peanuts and chickpeas) or new or novel grain legume crops. New projects in 2005–06 will facilitate the implementation of improved farming systems in three other regions: Innisfail-Babinda (through enhancement of grower group processes); NSW (through a participative process to collate existing productivity data from the top 20% (by gross \$/ha) of farmers, and identify opportunities for broad implementation; and the Ord River Irrigation Area (through grower-managed trials of new farming systems).

A project concluding in 2005–06 has been collaborating with the BSES PROSPER program to build skills in on-farm evaluation of innovative technology, economic evaluation of alternative cane farming practices, and delivery of best management practice to the industry. Annual work plans provide for group facilitation, group support, promotion of outcomes across industry and the wider community, evaluation of progress and change in economic, environmental and social indicators, and provision of agricultural economics service and training.

A new project based in the Burdekin will increase the level of economic information available to cane farmers in a range of formats, to build their capacity to use economic and profitability data as well as productivity figures in their decision making. This will support benchmarking activities being developed in the Burdekin through other initiatives. SRDC will also develop economic case studies of growers who have adopted innovative farming practices. These growers will discuss the economic and productivity outcomes of their innovations at regional farm-walks and workshops to which other growers are invited. Growers learning from growers improves the credibility of research findings and leads to greater uptake of improved practices by other growers.

A project concluding in 2004–05 has evaluated new soybean varieties as a break crop between sugarcane crop cycles, and one new variety will be released from this project in 2005–06. A new project from July 2005 will aim to provide at least two additional varieties: a small seeded (to give high germination and high vigour), light hulum, long duration, high biomass, nematode, rust and phytophthora root rot resistant replacement for the existing green manure/rotation soybean variety Leichhardt; and a well-adapted, high tofu-quality variety for those growers who seek to access the high-end export markets for beans to north Asia.

Canegrubs are the sugar industry's most damaging insect pest. Work will continue to promote adoption of decision support systems for management of greyback canegrub, and to develop means to integrate control of greyback and Childers canegrub into the improved farming systems developed through the SYDJV. The current use of intensive cultivation for control of Childers canegrub is at odds with the promotion of a farming system based on low-cost minimum tillage that also preserves organic matter and soil biodiversity.

To ensure a resilient farming system, it is important to protect the Australian sugar industry from exotic diseases and pests. SRDC's investments in this area address the **National Research Priority of *Safeguarding Australia*** and the **Rural R&D Priority of *Protecting Australia from invasive diseases and pests***.

The sugar industry is vulnerable to attack from invading pests and diseases, considering its location in the tropics adjacent to many of Australia's near neighbours. SRDC has supported,

and will continue to promote, activities to identify potential risks and establish contingency plans to deal effectively with possible incursions. SRDC has also invested substantial funding in recent years on diagnostic and taxonomic investigations to assist with insect and disease quarantine, and on development of plans to assist in preparation for and management of any invasion.

The greatest disease risk to the sugar industry in Queensland and NSW is sugarcane smut, which occurs in most other sugarcane-growing regions of the world including the Ord River Irrigation Area of Western Australia and can spread over long distances by wind-blown spores. For several years, SRDC has funded a program of screening sugarcane varieties and advanced clones in Indonesia for resistance to sugarcane smut in partnership with BSES and the Indonesian Sugarcane Research Institute. This program was significantly expanded from 2004–05 to enable the screening of early generation selections from the sugarcane breeding program, which will speed up the identification and release of new elite, smut-resistant varieties. A project in collaboration with the CRC for Tropical Plant Protection to study genetic diversity in strains of the sugarcane smut fungus from south-east Asia will conclude in 2005–06. This work has provided an assessment of the risk of new strains appearing and the need for broader screening of resistant varieties.

SRDC is also continuing to support efforts to minimise the impact of existing pests and diseases. A project investigating reliable means to screen for Fiji Leaf Gall (FLG, formerly Fiji Disease Virus) will conclude in 2005–06 and is showing considerable promise after years of frustration at getting poor expression of the disease in trials. The new screening method involves growing plants in pots for 4–5 months, exposing them to infective leafhoppers in a glasshouse for two weeks, and planting them out in the field. This method is providing reliable and consistent disease ratings for new varieties and is likely to be adopted across the entire breeding program.

Managing the impacts of climate variability is an important factor in enhancing the robustness of sugarcane farming systems. SRDC is a partner in the joint RDC Managing Climate Variability Program which has commissioned a range of projects. One of the approved projects aims to identify advanced climate forecasting systems to improve both short term (seasonal) and long term (decadal) risk management and planning in the sugar industry.

Varieties are an important part of a productive farming system. The provision of improved varieties has been a long-term component of the industry's approach to productivity, and has been a key area of investment since SRDC's inception. SRDC is continuing to invest in R&D for genetic improvement, but recognises that the realisation of such genetic gains will only be possible by combining better soil management with timely management of inputs in an integrated farming system.

The SRDC R&D Plan targets closer integration of conventional and biotechnological approaches to the breeding of sugarcane varieties. Continuing projects in 2005–06 will address both improved breeding and selection methodologies, and breeding for elite traits, including increased sugar content and resistance to pests and diseases. One project is developing complex software which requires large computing power to assist breeders to evaluate all known information when making decisions about which varieties to use as parents in the breeding program, and which lines to release as new varieties. Similar software is available for

some other crops, but it has not been developed for a crop with sugarcane's genetic complexity. The outcome will be greater industry profitability through a more efficient and effective breeding program which produces elite varieties that are selected either for particular benefits (eg high fibre production for cogeneration) or maximum general benefit across the industry value chain.

This and other aspects of the sugarcane plant improvement program address the **National and Rural R&D Priorities** of *Using frontier technologies for building and transforming Australian industries*.

SRDC is a core party to the CRC for Sugar Industry Innovation through Biotechnology (CRCSIIB) which commenced in August 2003. SRDC has committed \$4.9 million of project funding over seven years from 2003–04. The CRC has considerable potential to rejuvenate the sugar industry and contribute strongly to the national economy through elite sugarcane varieties with high sugar production or which can produce specialist materials such as bioplastics, oligosaccharides, enzymes and pharmaceuticals. SRDC funding in 2005–06 will be provided through three projects which are investigating the application of molecular markers to sugarcane breeding, the introgression of new genes from *Saccharum officinarum*, and the use of the sugarcane plant as a biofactory for biopolymers and for production of sucrose derivatives.

Two substantive new projects will commence in 2005–06. One will seek to better understand the interactions between sugarcane genetics (gene expression) and environment (including water and nutrient management) with respect to sugar accumulation (which is a current gap in knowledge of sugarcane physiology), to use both improved varieties and management practices to increase sugar yield. The other project will build on R&D conducted by CSR Sugar and the University of Queensland to develop their "Sugar Booster" technology which has shown promise of producing the value added-product isomaltulose as well as higher yields of sucrose and other fermentable sugars. This project will explore pathways for agronomic evaluation and regulatory assessment of genetically-modified sugarcane.

Outcome 2: Facilitation of change which promotes adoption of whole-of-system solutions to enhance revenue and cost efficiency across the value chain at mill area and regional levels

SRDC's investments towards this outcome also address the **National R&D Priority** of *Promoting and Maintaining Good Health* and the **Rural R&D Priority** of *Improving competitiveness through a whole of industry approach*.

Program A of the R&D Plan 2003–2008, **Value Chain Integration**, provides a specific focus for investment in R&D directed towards whole-of-system solutions. Many of SRDC's investments in **Program C, Processing and Distribution Systems**, are also directed towards this outcome.

Several continuing projects in 2005–06 will focus on opportunities to increase the value of the industry through integrated action across the value chain, which lead to greater gains than could be achieved through action in the individual profit centres alone. One project is developing a whole-of-industry predictive modelling capacity which will assist industry to explore alternative cost-effective production systems. This project will integrate expertise and

models developed separately for the farming and milling sectors of the industry. The models will enable the industry to explore the consequences of adopting new ventures in a mill region, commencing with pilot studies investigating whole crop harvesting for co-generation, inter-mill cane transfers and whole-of-system impacts of green cane harvesting in the Burdekin.

A major thrust towards this outcome is R&D on whole-of-system impacts of alternative cane supply management systems. Several recent projects demonstrated the potential for sustainable economic improvements by redesigning harvest and transport scheduling using systems modelling tools. New models have integrated knowledge of geographical harvesting, causes of cane and sugar losses, transport schedules and numbers of harvest and transport units, to implement change in the harvest and transport systems. SRDC will conduct a synthesis of previous value chain projects in the Australian and overseas sugar industries in late 2004–05, which will feed into a workshop in 2005–06 to identify and action new opportunities in value chain research. SRDC has allocated funding of \$332,000 in each of 2005–06 and 2006–07 for initiatives identified at the workshop.

Harvesting is a major linking point in the sugarcane value chain, and improved harvest efficiency has potential for economic and environmental benefits. In February 2005, the Parliamentary Secretary launched the SRDC publication *Cane Harvesting to Improve Industry Performance*. SRDC has invited proposals, due on 6 May 2005, for Harvesting Group Innovation Projects, and has allocated funding for these of \$350,000 in each of 2005–06 and 2006–07. SRDC is seeking novel industry-led approaches to facilitate engagement and implement change across the value chain, to achieve improved harvester efficiency and to reduce losses of cane and sugar during harvesting.

A project concluding in 2005–06 has assessed market signals related to harvesting best practice, and developed options for improved payment systems, which will provide incentives for growers, harvesters and millers to negotiate improved economic, environmental and social outcomes. A continuing project based in NSW is seeking to demonstrate that harvest and transport costs can be reduced to \$4 per tonne of cane through a range of measures including trialling automated harvest recording and feedback and establishment of a single, integrated harvesting cooperative in each mill area. Another project will build on current best practice harvesting initiatives through implementing harvester modifications to ensure that harvester component speeds are synchronised with ground speeds. This will lead to reduced sugar loss and stool damage, and higher harvested yields in the current crop and subsequent ratoons. A project which commenced during 2004–05 seeks to develop a rapid in-field sucrose loss measurement method to enable rapid feedback to the grower and harvester operator.

A new project in 2005–06 seeks to achieve improvements in cane quality and reductions in cane loss by equipping harvester operators with a real-time display of their performance against Harvest Best Practice (HBP) guidelines. Harvester operators will learn what is expected in different circumstances to comply with HBP, and compliance reports will be able to be used as key performance indicators in harvester contracts. Another new project based in the Burdekin will create a benchmarking system to enable harvest groups to compare their performance with other groups. The resulting information will enable groups to improve their performance by determining how changes in harvest group structures and arrangements will impact on harvesting costs, and test value chain integration options and harvesting cost models. In Mossman, a new payment system for growers and harvesters that equalises payments over the

season will be evaluated in the 2005 season, leading to improvements to transport efficiency through maximising quantities of cane delivery within geographic zones, and maximising sugar production within groups and individual farms through more efficient scheduling.

A series of projects is focussing on the facilitation of change through regional or mill area plans. In Mossman, a regional partnership with a broad range of industry and community stakeholders is targeting improved adoption of best practice in cane production, including by accreditation of “eco-efficient” farmers, efficiencies in harvest and transport by pursuing whole-of-system strategies and outcomes, and supporting tree planting as part of the Douglas Shire Sustainable Futures Strategy. In Mackay, a “cooperative systems” model has been developed to integrate the links of the value chain in order to add value to its component parts and enhance decision making and, ultimately, to increase regional industry revenue. In NSW, an industry system based around whole of crop harvesting to support cogeneration is being evaluated, which will necessitate modified farming, harvesting, transport and milling systems and will contribute to renewable energy production. In the Herbert, benefits worth \$5 million per annum could be realised through extended season length through improved utilisation of capital, improved efficiency of harvester scheduling, and improved ratoon performance.

Several projects are seeking cost and energy efficiencies in factory and storage processes, which will lead to enhanced steam and energy generation from bagasse. Other aspects of improved sugar quality will also be addressed through improvements to factory-based processes for juice separation, clarification, evaporation, precipitation, and crystallisation in vacuum pans, which will lead to cost efficiencies in these processes. New projects in 2005–06 will determine the potential benefits of juice and syrup clarification processes.

SRDC has contributed to a series of studies to support Australia’s role in international trade negotiations, which address the **Rural R&D Priority of Improved trade and market access**. One continuing study in 2005–06 will support more effective marketing of Australian sugar through improved yield forecasting. The project is developing an enhanced yield forecasting system through the integration of climate forecasting, remote sensing and crop modelling approaches. Improved yield estimates improve the marketers’ capacity to obtain premium prices through forward sales.

Outcome 3: *Demonstration of environmental sustainability to the satisfaction of all stakeholders*

SRDC’s investments towards this outcome directly address the **National R&D Priority of *An environmentally sustainable Australia*** and the complementary **Rural R&D Priority of *Sustainable natural resource management***.

Sustainable use and management of natural resources is a key focus of the SRDC R&D Plan 2003–2008 in the context of delivering triple bottom line benefits to the sugar industry and the Australian community. Continuing initiatives target more efficient utilisation of water and nutrient resources and improved quality of water leaving canelands.

Two projects are focussing on the interactions between water management and productivity in the irrigation areas of Queensland and the Ord River Irrigation Area in Western Australia. These studies are showing that water use can be reduced in the latter part of the season with no

yield penalties, and even yield benefits where the amount of lodging is reduced. Reduced water use also reduces irrigation costs and the risks of rising water tables, salinity, and loss of nutrients to groundwater. Practical methods of implementing improved irrigation practices in the Burdekin will be developed through groups of growers who will evaluate the economic and environmental benefits in partnership with researchers. Improved precision of irrigation will minimise loss of nutrients to run-off and groundwater and help to avoid rising water-tables and the risk of salinity.

A project based in an acid-sulphate soil area in NSW will construct a wetland to assess its ability to control toxic discharges and trap sediments that include nutrients and metal compounds. The wetland will be designed so that sediments can be removed periodically and returned to the land. Monosulphide materials in the sludge will be evaluated for their suitability as a catalyst for removing sulphur in the petrochemical industry.

A new project in 2005–06 will establish grower-participatory water quality monitoring in sugarcane sub-catchments within the Herbert. Rapid feedback of water quality results from caneland runoff will increase awareness of the relationship between land management practices and water quality, improve the level of consultation and collaboration between Herbert landholders and the community, and validate improved farming practices and risk management procedures for minimising off-site nutrient movement.

Projects focusing on nutrient management will integrate the considerable body of past knowledge on nutrient requirements of sugarcane with new research which links nutrient management to specific soil and crop characteristics. Optimal fertiliser management is targeted at both improved profitability and minimising losses of nutrients off-farm. Field evaluation is underway of a hypothesis that nitrogen management based on nitrogen losses during the previous crop, including removal in the cane, would lead to better linking of nitrogen application to crop demand, lower nitrogen use, and reduced nitrogen losses to the environment. Related work will extend previous studies in the Herbert and Bundaberg areas that link nutrient recommendations with knowledge of nutrient supply characteristics of different soil types. These projects will be closely integrated and will jointly conduct an annual industry workshop to promote improved nutrient management, which will result in better targeted fertiliser application, lower costs and reduced nutrient losses in off-farm water flows, while maintaining or enhancing sugar yields.

In 2004–05 SRDC contracted with the Department of Agriculture, Fisheries and Forestry to manage, over three years, a major initiative to implement a Farm Management System (FMS) Framework for the Sugar Industry, with funding from the Natural Heritage Trust. This initiative has five sub-programs which will continue during 2005–06. The first is to develop interactive web-based materials to support FMS. This project will compile an interactive web-based database on legislation and current best management practices, and develop web-based regional natural resource management risk assessment tools and generic sugar FMS templates and guides. This will contribute to enhanced adoption of FMS by cane growers through easier FMS development and improved understanding of requirements.

The second FMS project will determine key performance indicators for each cane production district to assess changes in economic and environmental criteria arising from the application of FMS risk assessment methodology. As a result, improved farm efficiencies, economic

performance and environmental management across each region will flow on to healthier ecosystems and local communities. In particular, performance of below-average growers will improve following promotion of practices to achieve benchmarks set by better performing peers.

The third FMS project will develop an FMS training program to raise awareness in cane growers of the economic and environmental benefits of incorporating and integrating a range of previous industry initiatives within a management framework that facilitates increased productivity and better environmental outcomes. The FMS training program will increase the capacity of cane growers to implement FMS within their own cane farming businesses. At least 600 growers from all regions of the industry will obtain face-to-face training during the project and all growers will be offered free access to online self-paced learning materials and tools to develop an FMS.

The fourth FMS project will develop guidelines and tools for farmers to be able to conduct a low cost, accurate, yet unbiased self-audit. The research will also assist farmers to be able to understand the process and advantages of auditing by a second party, and to enable farmers to proceed towards third party accreditation if required.

The fifth FMS project will evaluate the effectiveness of the FMS program, through assessing the impacts to the industry and the wider community from adoption of FMS, determining changes in attitudes to FMS as a result of project activities, determining satisfaction of stakeholders with the FMS projects, and communicating information about effective project management and the social aspect of adoption/non-adoption of FMS.

This outcome also addresses the **National R&D Priority of *Promoting and maintaining good health***. The primary focus for SRDC investment has been in workplace health and safety. SRDC will continue to participate in the joint RDC program on Farm Health and Safety which runs until 2006–07. One project in this program has examined health and safety issues on sugarcane farms, and the recommendations of that project will be promoted. Several other projects conducted by the joint program will also be relevant to sugarcane growers, including all-terrain vehicle safety and injury prevention, children's safety on farms, and incentives for adoption of safe farm work systems.

Continuing work is investigating an improved surface for mill rollers which avoids arc-welding, and significantly improves the health and safety conditions of mill workers. The experimental roll shell surface is composed of a more durable iron material and tungsten hard-facing on the groove tips. It will result in cost savings to mills in addition to the workplace health and safety benefits.

This outcome also addresses the **Rural R&D Priority of *Maintaining and improving confidence in the integrity of Australian agricultural, food fish and forestry products***. Raw sugar is a processed commodity with an extremely low risk of medically significant contamination. Previous SRDC-funded research has established that residues of agricultural chemicals are negligible or undetectable. Nevertheless projects addressing integrated pest management will generally lead to reduced use of pesticides. IPM for canegrubs (discussed under Outcome 1) can involve replacement of chemical insecticides with the commercial biological control product BioCane, which is based on the *Metarhizium* fungus. These

initiatives are being promoted as part of systems approaches to canegrub control and will enable the sugar industry to maintain its record of sugar products free from chemical contamination. One of SRDC's postgraduate scholarship recipients is studying IPM of rodent pests in sugarcane, which will help to reduce chemical usage in the industry.

Outcome 4: *Diversification of the income stream from products derived from sugarcane*

The main avenues of diversification being currently pursued in SRDC's portfolio are electricity generation by mills and alternative products under investigation through the CRC for Sugar Industry Innovation through Biotechnology (CRCSIIB). Much of this R&D is also relevant to Outcomes 1 and 2, and has been discussed in that context. This work addresses the complementary **National and Rural R&D Priorities of *Using frontier technologies for building and transforming Australian industries.***

Projects supporting an enhanced revenue stream through cogeneration are focussing on drying bagasse and trash to improve their energy efficiency. Projects discussed under Outcomes 1 and 2 are investigating whole crop harvesting and/or expansion of season length, which will, among other benefits already described, result in greater amounts of bagasse and trash available for electricity generation.

Studies conducted through the CRCSIIB are investigating means of producing specialist materials such as bioplastics, oligosaccharides, enzymes and pharmaceuticals in elite sugarcane varieties, and extraction and fermentation technologies which can lead to improved processes for production of foodstuffs, nutraceuticals and feedstocks such as ethanol. The Sugar Booster project discussed under Outcome 1 will investigate production of alternative high value sugars.

A new project in 2005–06 will investigate production of novel biodegradable composite materials for the packaging industry, from sugarcane. The ultimate aim is to produce economic and environmental benefits through sustainable applications in packaging and building industries to replace non-degradable fossil fuel-based packaging materials.

Outcome 5: *Enhancement of human capacity and partnerships between industry, research and regional communities to underpin change, learning and innovation*

This Outcome addresses the **National and Rural R&D Priorities of *Using frontier technologies for building and transforming Australian industries*** and the **Rural R&D Priority of *Creating an innovative culture.***

Program D (Industry Capacity) of the SRDC R&D Plan 2003–2008 is specifically devoted to building the human capacity for change, learning and innovation in the sugar industry.

Several initiatives to support leadership development programs will continue in 2005–06. One hundred industry leaders have graduated from the Industry Capacity Building program conducted in collaboration with CSR Sugar Ltd, and a further 25 will complete the program in 2005–06. Each participant has conducted a project in their own work areas, often with substantial economic benefits. SRDC will also sponsor a Continuous Improvement and Innovation program for the Isis and Maryborough areas. Facilitated by experienced QDPI

personnel, the program will deliver principles, processes and tools of continuous improvement and innovation. Participants will be supported in conducting a specific learning activity over the following 12 months, which will focus on implementation of change in the context of their own job responsibilities.

A new project in 2005–06 will evaluate a leadership program developed for rural industries in southern Australia. The Leading Industries Program will target 60 young people who have the potential to positively impact the future of the industry. The outcome is people who are aware of their skills, how the industry system works, and the various opportunities for industry involvement.

An innovative project commenced in 2004–05 to conduct a cultural imprint analysis in the Herbert. A range of “stories” have been collected that describe the way the community works or doesn’t work together. These provide initial learnings from which will be used to initiate dialogue with stakeholder focus groups about how to progress on larger industry issues such as rationalisation and economies of scale. This novel approach will deliver the opportunity for sugar industry people in the Herbert region to improve the efficiency and effectiveness of their joint operations, and will lead to economic, social and environmental benefits to the region through improved communication and engagement among stakeholders.

SRDC is supporting the Tully sugar industry to build capacity for change, learning and innovation in future leaders across the value chain to enable the achievement of the Tully Vision. The project will develop the management ability of participants in the established Vision Action Teams and leaders from the current farmer groups to improve the profitability and sustainability of the Tully industry, and assist in implementing the Tully Strategic Plan.

A new project aims to improve the economic, social and environmental performance of 70 cane farming businesses in the Isis cane supply area by building the capacity of these families to cope with and adapt to change and fostering their ability to implement improved business planning and management skills. As part of Isis Target 100, the project will apply the QDPI Building Rural Leaders program which delivers specialised, interactive, grower-friendly workshops on change and action learning.

A continuing project is assessing means of moving from case studies to broad industry implementation of new technology, and will use climate forecasting and crop simulation models as pilot technologies. The project will demonstrate the benefits from, and identify means of achieving, broad adoption of new technologies. Two other projects to assist the delivery of factory technology developed by SRI are also continuing. They aim to increase the capability of sugar mill staff to plan and control factory processes by providing troubleshooting/help manuals and making SRI modelling software accessible via the SRI web site. A new web-based information system portal will be incorporated into the SRI web pages.

SRDC will contribute to several initiatives in partnership with Department of Agriculture, Fisheries and Forestry and other Rural R&D Corporations, including the Department of Agriculture, Fisheries and Forestry’s *Industry Partnerships Corporate Governance for Rural Women Initiative*, the *Science and Innovation Awards for Young People in Agriculture, Fisheries and Forestry*, and the *Cooperative Venture for Capacity Building for Innovation in Rural Industries*.

A new project in 2005–06 will demonstrate the outcomes that can be achieved through productivity focused incorporated grower groups, by investigating and documenting the options for grower groups to become a registered entity or incorporated body, and by working with a pilot group. The project seeks to demonstrate how participative R&D combined with action learning can deliver greater productivity, profitability and sustainability outcomes in shorter periods of time than current sugar industry extension tools.

In 2004–05 SRDC inaugurated Excellence in Grower Group Awards and Grower Group Innovation Projects. Excellence in Grower Group Awards will be made in conjunction with SRDC's Regional Workshops in April each year to recognise innovation in grower groups. The first applications for Grower Group Innovation Projects are due on 31 May 2005. Grower Group Innovation Projects are for grower groups to develop and build their capability to conduct their own research and development into more profitable and environmentally sustainable sugarcane farming systems. SRDC has allocated \$250,000 in 2005–06 and \$500,000 per year in 2006–07 and 2007–08 for this initiative. Funding of up to \$40,000 per year for up to two years is available for grower groups to enhance the skills of people within the group; the implementation of smart farming systems; the business profitability of group members; and their environmental performance. Funding can be used for a range of activities, including acquiring equipment for sharing within the group to test potentially better farming systems, group coordination and meetings, hosting workshops/ field days and hiring people to enhance group skills.

SRDC has promoted Travel and Learning Opportunity initiatives with two calls for proposals per year from 2004–05, with up to \$200,000 funding available per year. SRDC is targeting capacity building in industry personnel through travel or through exposure to resource people visiting their regions, in addition to travel by researchers to workshops and conferences. SRDC provides partial funding for these activities, with partnership funding required from those travelling or from other organisations. Fourteen Travel and Learning Opportunity Projects were approved in November 2004, for activities during calendar 2005, and a further 13 were approved in March 2005 for activities during 2005–06. A further call for Travel and Learning Opportunity Projects to be conducted in calendar 2006, with \$132,000 funding available, will close on 31 May 2005.

Of the 27 projects, 14 (including four overseas) provide opportunities for industry personnel to learn new and different ways of doing things through visiting other regions and/or industries. Projects to be conducted in 2005–06 are outlined briefly below. They will incorporate an appropriate communication strategy to ensure that benefits are communicated to the broader industry. Two projects have a particular focus on women in the industry. A further four projects in the Burdekin, Innisfail, Bundaberg and NSW regions will conduct industry workshops on topics including successful grower groups in other industries, cane payment, variety best practice and community engagement.

Four industry representatives from the Burdekin and Plane Creek regions will investigate natural resource management programs in Florida, and farming systems and harvesting R&D in Argentina.

Around 25 innovative NSW farmers will visit the Central region to interact with local growers, particularly on the topics of co-operative harvesting, row configurations for controlled traffic, direct drilling of cane using billet planters, harvester modifications and use of alternate break crops.

Four industry leaders from the Herbert and two BSES officers will visit the sugar industry in South Africa to examine adoption of farm management practices including farm layout, nutrient management, variety management and soil health, regional extension programs and farmer education programs, extended season length and the use of chemical ripeners, farm and financial record keeping systems, and industry R&D services through the South African Sugar Research Institute.

Around 22 Herbert industry participants will visit Sarina and Emerald to investigate management practices that will provide major environmental, economic and social benefits for the industry, including strategic, minimum tillage, zero tillage, controlled traffic and trash blanketing in dry-land farming systems.

Two Mackay grower-group coordinators will travel to the Grower Group Alliance (Western Australia), to build their capacity to improve the structure, communication and evaluation of Mackay grower groups.

Two industry representatives will travel to Chesapeake Bay in Maryland, USA, to learn from the major stakeholders within the catchment (including farmers, government agencies and NGO's) the key messages of success for their water quality management strategy for a range of non-point sources to the bay. A review of the policy instruments used by the Chesapeake Bay Catchment Authority and other parties will indicate what strategies and processes have been successful or otherwise in their efforts to improve water quality.

Around 18 Bundaberg growers will travel to Walgett to visit grain properties and inspect their farming systems, and then to Casino to visit innovative cane farming enterprises that practice new farming systems. Key topics of interest will be attributes of successful grower groups, improved farming and harvesting systems, the process of change, and improved understanding of the role of partnerships in achieving change towards a more profitable and sustainable sugar industry.

The three grower members of the Ord River Canegrowers pricing committee will visit marketing organisations in Queensland to investigate the world shipping system and the futures and options markets. The trip will help to develop a marketing/hedging plan and strategy to maximise the price received by canegrowers.

Members of the Isis Women in Sugar Group will visit research and industry organisations in Brisbane to develop their appreciation of the complexities of the sugar industry through the opportunity to meet with industry leaders, discuss innovative developments and highlight the plight of women in industry.

Thirty Bundaberg and Isis growers will travel to Ballina to investigate harvesting co-operatives and grain handling facilities and interact with other growers to understand their farming system and how they achieve their results. They will also visit Grafton Research Station and interact with researchers about the development of new soybean varieties and agronomic best practices.

Outcome 6: An effective R&D capability underpinning industry futures.

This Outcome is also a focus of Program D and addresses the **National and Rural R&D Priorities** of *Using frontier technologies for building and transforming Australian industries* and the **Rural R&D Priority** of *Creating an innovative culture*. Within Program D, SRDC seeks to promote more effective coordination of R&D activities across industry and R&D providers, to enhance the performance of the R&D system through evaluation, review and feedback, and to encourage a broad range of R&D providers. SRDC wishes to facilitate enhanced skills in R&D personnel.

SRDC requires all R&D project proponents to nominate in their proposals the means they will use to implement change and deliver project outcomes. SRDC conducts workshops annually in December to assist investigators who have been invited to submit full proposals to integrate adoption and evaluation into project design. This process is intended to also build capacity in investigators through developing an ethos of, and skills in, evaluation.

Industry participation in SRDC's Travel and Learning Opportunity projects was described in Outcome 5. The remaining nine Travel and Learning Opportunity projects from the calls conducted in 2004–05 target increased capacity among researchers and advisers. These projects will also incorporate an appropriate communication strategy to ensure that benefits are communicated to the broader industry.

Burdekin advisory staff Dale Chapple (BSES), Rob Milla (BSES) and Lisa McDonald (CSR Sugar) will attend the Australasia Pacific Extension Network (APEN) Conference in March 2006. The conference will build skills that will be applied within the Burdekin CPI/Prosper program through the theme of resilient, thriving communities. Engagement with the community is the next important step in extending the success of the extension program in the Burdekin, particularly in furthering adoption of best practices for environmental management.

BSES Entomologist Dr Mohamed Sallam will spend 10 weeks at Louisiana State University to develop capacity in methods of detection, incursion management, containment and eradication systems for North and South American cane borers, and will also attend the International Conference on Lepidopterous Stem-borers in Nairobi, Kenya, in October 2005. This travel will improve the ability of the Australian sugar industry to manage an incursion of an exotic pest. Ms Katherine Muirhead from Adelaide University will also attend the Nairobi meeting to present a paper on her PhD research on biological control of sugarcane stem-borers in Australia.

Dr Yvette Everingham from JCU will visit international experts on the IPO (Inter-decadal Pacific Oscillation) in the USA and UK. The IPO can potentially provide clues about climate we will experience over much longer time scales (eg decades). Dr Everingham will obtain critical feedback from international climate scientists on her research which has investigated the ability to forecast decadal rainfall variability using the IPO.

In August 2006, two sessions on sugarcane biotechnology will be held in a conference on Tropical Crop Biotechnology in Cairns. SRDC support will support attendance by world leaders in this area to address the conference and interact with Australian sugarcane researchers. The visits will develop international collaborative linkages and promote strategies for the accelerated implementation of biotechnology outputs in the sugarcane breeding program.

Dr Rosanne Casu of CSIRO Plant Industry and the CRC SIIB will attend the Plant and Animal Genome XIV Conference in San Diego to present recent results on genomics and global gene expression in sugarcane, and strengthen existing international linkages and develop collaborative approaches with other scientists working on functional genomics, bioinformatics and genetic analysis in sugarcane and related grasses.

Mr Tom Rainey from SRI will attend the 2006 Australian Pulp and Paper Industry Technical Association (APPITA) conference in Melbourne to develop his skills base in the production of value-adding materials from bagasse, and biomass pulping.

Dr Lisa McDonald from CSR Sugar will attend a residential school at Hawkesbury Agricultural College to add capacity to the Burdekin Cane Productivity Initiative in the area of social understanding and organisational development.

Dr Peter Thorburn from CSIRO Sustainable Ecosystems will attend the 14th European Nitrogen Conference in The Netherlands and the 2006 conference of the American Society of Agronomy in Salt Lake City, USA. The travel will focus on changed management of N fertilisers in agricultural industries in response to recent water quality policy in the European Union and USA. It will lead to better research and implementation outcomes for the sugar industry in the context of the Reef Water Quality Protection Plan and general community expectations.

SRDC will continue its postgraduate scholarship program in 2005–06. Nine continuing postgraduate scholars are studying in a range of disciplines including plant breeding and biotechnology, rodent pest management, nitrogen management and water quality in sugar catchments, environmental codes of practice, exotic pest threats, bagasse fractionation and harvester design. Three of these are expected to conclude in 2005–06 and four new scholarships will be offered. SRDC will also participate in the Innovator of the Year Award (with Queensland Sugar Limited) and will offer the SRDC Research/Extension and Service to Industry R&D Awards, which recognise excellence in research and/or extension in the sugar industry, and honour exemplary service in the support of R&D to benefit the industry.

ATTACHMENT A

PROJECTS AND SCHOLARSHIPS IN 2005–06

Project	Title	Duration	Contact	Funds 2005–06
Program A Value Chain Integration				
Strategy A1 Develop knowledge, technologies and implementation processes to optimise the use of whole-of-system resources				
<i>Continuing Projects</i>				
BSS264	Adoption of an optimal season length for increased industry profitability	Jul-04–Sep-07	Mr Lawrence DiBella	\$122,860
CSE004	Improving yield forecasting capability to enhance market strategies for the Australian sugar industry	Sep-02–Sep-05	Dr Yvette Everingham	\$27,000
CVA002	Managing Climate Variability Program	Sep-03–Sep-07	Dr Barry White	\$40,000
MAS001	A regional partnership approach to developing a sustainable sugar cane system	Jul-03–Sep-07	Mr Allan Rudd	\$78,969
MSA003	A cooperative systems model for the Mackay regional sugar industry	Jul-03–Aug-05	Mr Geoffrey Fleming	\$30,000
NSC005	Implementing an integrated sugar system in NSW	Jul-03–May-06	Mr Rick Beattie	\$76,000
<i>New Projects</i>				
CSR033	Benchmarking harvest group practices in the Burdekin	Jul-05–Oct-07	Dr Lisa McDonald	\$76,875
Strategy A2 Facilitate sustainable whole-of-system change using a cooperative approach across the industry value chain				
<i>Continuing Projects</i>				
BSS261	Measurement and feedback systems for improving market signals for harvesting	Jul-03–Sep-05	Mr Trevor Willcox	\$36,000
CSE005	Integrating and optimising farm-to-mill decisions to maximise industry profitability	Jul-02–Jul-06	Dr Andrew Higgins	\$140,950
CSE009	Moving from case studies to whole of industry: Implementing methods for wider industry adoption	Jul-03–Aug-07	Dr Yvette Everingham	\$214,866
CSE010	Integrated value chain scenarios for enhanced mill region profitability	Jul-03–Sep-05	Dr Peter Thorburn	\$75,217

Project	Title	Duration	Contact	Funds 2005–06
CSE013	Increasing the capacity to identify and action value chain integration opportunities	Apr-05–Aug-05	Dr Andrew Higgins	\$4,846
MAS002	Improving harvest efficiency in the Mossman Central Mill area	Feb-05–Apr-06	Mr Daryl Parker	\$48,763
NSC006	Achieving world's best practice harvesting and transport costs for the NSW sugar industry	Jul-04–May-07	Mr Rick Beattie	\$118,267
SRD001	Cane harvesting to improve industry performance	Jan-05–Sep-05	Dr Les Robertson	\$33,736
<i>New Projects</i>				
HGIP	Harvesting Group Innovation Projects	Jul-05–Jul-06	Dr Les Robertson	\$350,000
SRD004	Value Chain Workshop	Jul-05–Sep-05	Ms Tracy Henderson	\$25,000
VCIP	Value Chain Integration Projects	Jul-05–Jul-06	Ms Tracy Henderson	\$332,000
Total for Program A				\$1,831,349
Program B Farming Systems				
Strategy B1 Develop knowledge, technologies and implementation processes to underpin sustainable farming systems				
<i>Continuing Projects</i>				
BSS260	Enhanced delivery of PROSPER to achieve adoption of Best Management Practices in the Queensland sugar industry	Dec-02–Feb-06	Mr Eoin Wallis	\$285,000
CPI005	Adapting soybean for profitable rotations in sugarcane farming systems	Jul-02–Sep-05	Dr Andrew James	\$10,000
CSE001	Increased profitability and water use efficiency through best use of limited water under supplementary irrigation	Sep-00–Dec-05	Dr Geoff Inman-Bamber	\$20,000
CSE007	Implementation of irrigation practices for profitable resource efficient sugarcane production in the Ord	Sep-02–Sep-06	Dr Geoff Inman-Bamber	\$90,513
FMS001	Farm Management Systems for the Sugar Cane Industry, Sub-program 1: Interactive web-based material to support FMS	Nov-04–Sep-05	Mr Don Chambers	\$15,055
FMS002	Farm Management Systems for the Sugarcane Industry, Sub-program 2: Environmental and economic performance indicators	Nov-04–Mar-06	Mr Don Chambers	\$98,993

Project	Title	Duration	Contact	Funds 2005–06
FMS004	Farm Management Systems for the Sugarcane Industry, Sub-program 4: Options for auditing and certification of FMS	Nov-04–Mar-06	Mr Don Chambers	\$18,611
NSC008	Setting productivity and cost savings targets for the NSW sugar industry	Jan-05–Aug-05	Mr Rick Beattie	\$13,900
SRD002	Case studies of improved economic performance from implementing innovations on farms	Jan-05–Oct-05	Dr Les Robertson	\$20,000
UNW003	Development of a constructed wetland for improving water quality in sugarcane drainage, and ensuring its community acceptance and industry adoption	Jul-04–May-07	Assoc Prof Mike Melville	\$31,345
<i>New Projects</i>				
CG013	Growers working together to improve water quality in the Herbert Sugar Industry	Jul-05–Aug-08	Mr Tim Wrigley	\$114,450
CPI009	New soybean varieties for fallow cropping of sugarcane fields	Jul-05–Oct-08	Dr Andrew James	\$22,356
DPI015	Enhancing an economic way of doing business in the cane industry	Jul-05–Aug-08	Mr Neil Sing	\$80,000
<i>Strategy B2 Improve the genetic performance of the sugarcane plant for increased sugar production in diverse environments and for the generation of new products</i>				
<i>Continuing Projects</i>				
BSS250	Improving selection systems and data analysis in sugarcane breeding programs	Jul-00–Jan-06	Dr Xianming Wei	\$90,772
BSS255	Improving the plant breeding selection system for Fiji disease resistance	Jul-02–Dec-05	Mr Barry Croft	\$13,700
BSS256	Reducing the Australian sugar industry's genetic vulnerability to sugarcane smut	Jul-02–Apr-07	Mr Barry Croft	\$86,873
BSS258	Assessing the impact that pathogen variation has on the sugarcane breeding program	Jul-02–Jan-06	Dr Kathy Braithwaite	\$2,000
BSS265	Smut-proofing the Australian industry — ensuring a reliable cane supply through reduced genetic vulnerability to sugarcane smut	Jul-04–Apr-10	Mr Barry Croft	\$64,911
BSS267	Maximising whole-of-industry benefits from the Australian sugarcane improvement program through an optimal genetic evaluation system	Jul-04–Sep-07	Dr Xianming Wei	\$257,500

Project	Title	Duration	Contact	Funds 2005–06
CRC002	Application of molecular markers to sugarcane breeding	Aug-04–May-06	Dr Phillip Jackson	\$345,883
ICB009	Map-based cloning of a rust resistance gene in sugarcane	Jul-02–Oct-05	Dr Angelique D'Hont	\$14,000
UQ039	Gene control sequences for metabolic engineering in sugarcane	Jul-02–Feb-06	Dr Robert Birch	\$20,000
<i>New Projects</i>				
CSE014	Increased CCS, cane yield and water use efficiency by exploiting interactions between genetics and management	Jul-05–Aug-09	Dr Geoff Inman-Bamber	\$154,453
UQ040	Extending Sugar Booster technology into multiple sugarcane cultivars for optimal deployment by Australian industry	Jul-05–Aug-10	Dr Robert Birch	\$252,650
Strategy B3 Implement integrated solutions for sustainable sugarcane production by using a systems approach to best practice				
<i>Continuing Projects</i>				
BSS257	GrubPlan 2: Developing improved risk assessment and decision-support systems for managing greyback canegrub	Jul-02–Jul-06	Dr Peter Samson	\$158,502
BSS266	Optimum canegrub management within new sustainable cropping systems	Jul-04–Mar-09	Dr Peter Samson	\$153,908
BSS268	Accelerated adoption of best-practice nutrient management	Jul-04–May-08	Dr Bernard Schroeder	\$256,475
BSS269	A new cropping system for the Central District	Jul-04–Oct-08	Mr Chris Aylward	\$108,505
CG009	Investigating opportunities for a grain and legume industry in a coastal sugarcane cropping regime	Feb-05–Sep-05	Ms Judy Skilton	\$3,045
CSE011	Improved environmental outcomes and profitability through innovative management of nitrogen	Jul-04–May-08	Dr Peter Thorburn	\$271,869
CSE012	Adopting systems approaches to water and nutrient management for future cane production in the Burdekin	Jul-04–May-08	Dr Peter Thorburn	\$218,920
YDV002	Sugar Yield Decline Joint Venture (Phase 2)	Jul-99–May-06	Dr Alan Garside	\$148,000
<i>New Projects</i>				
BSS286	Improved sugar-cane farming systems	Jul-05–Aug-08	Dr Alan Garside	\$469,644

Project	Title	Duration	Contact	Funds 2005–06
IBS002	Specialist grower groups enhancing BMP packaging & adoption in Innisfail & Babinda districts	Jul-05–Aug-08	Mr George Bugeja	\$59,250
WAA003	Evaluation and Implementation of modified farming systems in the ORIA	Jul-05–Aug-09	Dr Joe Sherrard	\$63,310
Total for Program B				\$4,034,393
Program C Processing and Distribution Systems				
Strategy C1 Develop enhanced capability in analysing and optimising processing and distribution systems				
<i>Continuing Projects</i>				
SRI122	The functional relationship between juice properties, operating conditions and heat transfer in Roberts evaporators	Jul-02–Aug-05	Dr Ross Broadfoot	\$10,000
SRI123	Crystallisation studies in a pilot batch vacuum pan	Jul-02–Dec-05	Dr Ross Broadfoot	\$100,000
SRI134	Low moisture mill mud for more cost effective return to cane fields	Jul-03–Aug-05	Mr Rod Steindl	\$11,262
<i>New Projects</i>				
SRI143	Commercial evaluation of alternative juice clarification processes	Jul-05–Dec-06	Dr William Doherty	\$95,358
Strategy C2 Develop and implement innovative technology and best management practices that enhance revenue, and improve capital utilisation and environmental performance in harvest, transport, milling and marketing systems				
<i>Continuing Projects</i>				
BSS270	Regional adoption of alternative harvester configurations for sustainable harvesting efficiency	Jul-04–Sep-07	Mr Cam Whiteing	\$206,000
SRI049	Aerodynamic optimisation of extraction chambers for high pour-rate pneumatic cane cleaning devices	Jul-95–Aug-05	Dr Phil Hobson	\$0
SRI052	A transport model for airborne particles associated with bagasse	Jul-95–Aug-05	Dr Phil Hobson	\$0
SRI136	Low cost and energy efficient ambient drying of large-scale bagasse and trash stockpiles for increased industry income from power	Jul-04–Sep-06	Dr Phil Hobson	\$51,406
SRI137	Factory trial of modified long life roll shell surface	Jul-04–May-06	Dr Gaye Davy	\$64,850

Project	Title	Duration	Contact	Funds 2005–06
SRI138	Increase the energy efficiency and revenue of sugar factories	Jul-04–May-06	Dr Ross Broadfoot	\$55,000
SRI141	A preliminary assessment of methods to measure in-field sugar loss	Mar-05–Jan-06	Dr William Doherty	\$44,831
<i>New Projects</i>				
AGX001	Harvester best practice on-board expert system and monitoring	Jul-05–Aug-07	Mr Robert Crossley	\$49,550
SRI144	Determination of factory benefits from full implementation of syrup clarification	Jul-05–Sep-06	Mr Rod Steindl	\$222,466
Strategy C3 Diversity the income stream from the products of sugarcane, primarily by broadening the product base				
<i>Continuing Projects</i>				
CRC003	Use of sugarcane as a biofactory for production of biopolymers	Apr-04–May-06	Dr Michael O’Shea	\$187,903
CRC004	Sucrose derivative production in sugarcane	Sep-03–May-06	Dr Barrie Fong Chong	\$134,322
<i>New Projects</i>				
JCU025	Thermoformable biodegradable composite material from sugar cane bagasse fibre	Jul-05–Aug-07	Dr Chris Berndt	\$182,200
Total for Program C				\$1,446,447

Program D Industry Capacity

Strategy D1 Enhance people’s capacity to learn and change

<i>Continuing Projects</i>				
AFF001	Corporate governance for rural women	Jul-02–May-06	Ms Tracy Henderson	\$10,000
BSS278	Sugar industry training on community engagement	Jan-05–Dec-06	Mr Peter McGuire	\$0
BSS280	Overseas sugarcane quarantine and emergency response planning	Jul-05–Dec-05	Dr Mohamed Sallam	\$4,250
BSS281	To enhance the capacity for whole of system change in the Herbert Sugar Industry by taking selected leaders on a study tour of Southern Africa.	Apr-05–Aug-05	Mr Lawrence DiBella	\$2,000
BSS282	Farming systems tour for the Herbert Sugar Industry	Mar-05–Nov-05	Mr Mark Poggio	\$1,320

Project	Title	Duration	Contact	Funds 2005–06
BSS283	Presentation of BMP variety workshops	Jan-05–May-06	Mr Tony Linedale	\$1,375
BSS284	Building capacity for grower group coordinators in the Mackay region	Feb-05–Sep-05	Mr Joe Muscat	\$1,180
BSS285	Building capacity of group members of the Mackay Fibre Producers in a fibre-production value chain	Jan-05–Sep-05	Mr Joe Muscat	\$1,000
CG007	The Tully Sugar Industry Project — “Working together for our Future” Phase 2	Nov-04–Sep-05	Mr Peter Lucy	\$12,750
CG008	Targeted Planning for Profit: A grass roots program to build grower skills to manage change and implement integrated future planning	Feb-05–Feb-07	Ms Judy Skilton	\$67,344
CG010	Field trip to the Emerald cotton farming region to inform cane growers & professionals with regard to Farm Management Systems (FMS)	Jan-05–Aug-05	Mr Bill Boylson	\$410
CG011	A Changing Future:— Enhancing grower skills and confidence to respond to industry restructure in the Isis and Maryborough Districts	Jan-05–Sep-05	Ms Judy Skilton	\$2,000
CG012	A review of voluntary, market based & statutory based instruments used in conjunction with the farming community in Cheaspeake Bay catchment, USA.	Feb-05–Aug-05	Mr Tim Wrigley	\$2,000
CSR029	Building capacity to lead and implement regional transformation in the sugar industry	Jul-03–Oct-05	Mr Greg Livingstone	\$50,000
CSR030	Herbert cultural imprint analysis — A pathway to greater understanding and co-operation in decision making	Jul-04–Sep-06	Mr Gavin Hughes	\$89,606
CSR032	Learning lessons from extension programs for improved environmental management farming practices in Florida and harvesting research in Argentina	Jul-05–Jan-06	Dr Lisa McDonald	\$10,000
DHC001	Innovating and Developing Human Capacity in Rural Industries (joint RDC program)	Jul-01–Jul-06	Ms Tracy Henderson	\$40,000
FMS003	Farm Management Systems for the Sugarcane Industry, Sub-program 3: FMS training course	Feb-05–Mar-07	Mr Don Chambers	\$362,455
IBS001	How are Herbert and Burdekin growers dealing with low sugar prices — A study tour for Innisfail Babinda growers	Aug-04–Aug-05	Mr George Bugeja	\$0

Project	Title	Duration	Contact	Funds 2005–06
NSC010	Bringing together innovative farmers from NSW and the Central Region	Jan-05–Dec-05	Mr Rick Beattie	\$2,500
PCS001	Harvesting rationalisation learning expedition	Jan-05–Aug-05	Ms Sarah Jones-Trifelly	\$1,088
RDA002	Grower Group Awards	May-05–May-09	Mr Neale Price	\$80,000
SRI130	Technology transfer — more skilled factory staff via troubleshooting/help manuals and access to SRI modelling software	Jul-03–Sep-06	Mr Rod Steindl	\$7,000
WS011	Building capacity for continuous improvement and innovation in the Isis and Maryborough Sugar Regions	Feb-05–Nov-06	Ms Janice Timms	\$35,000
<i>New Projects</i>				
BSS287	Enhancing grower groups in the Australian sugar industry	Jul-05–Aug-07	Mr Chris Aylward	\$39,190
BSS288	Bus Tour for Bundaberg and Rocky Point growers to contrast grain and sugar industry group dynamics	Jul-05–Apr-06	Mr Barry Callow	\$5,324
BSS289	Everything you wanted to know about cane payment but were too afraid to ask — information workshops for female business partners in the sugar industry	Jul-05–Apr-06	Mr Drew Burgess	\$8,400
CG014	Enhancing the Isis women in sugar groups knowledge and capacity to address industry issues	Jul-05–Apr-06	Mr Clinton Muller	\$3,200
CG015	Enhancing the knowledge of the CANEGROWERS Grain in Cane group — Investigating other Grain in Cane enterprises	Jul-05–Apr-06	Mr Allan Dingle	\$7,010
DPI016	Sugarcane grower groups learning from the successful established Birchip Cropping Group	Jul-05–Sep-05	Mr Andrew Lashmar	\$9,650
GGIP	Grower Group Innovation Projects	Jul-05–Jul-08	Ms Tracy Henderson	\$250,000
JCU026	The IPO — signal or noise?	Jul-05–Apr-06	Dr Yvette Everingham	\$5,000
LDI001	Developing the leadership capacity of the Australian Sugar Industry	Jul-05–Apr-08	Ms Cheryl Phillips	\$86,000
ORC001	Development of a marketing strategy and reporting mechanism for Ord River Canegrowers	Jul-05–Mar-06	Mr Paul Mock	\$5,000
TLOP	Travel and Learning Opportunity Projects	Jul-05–Jul-08	Ms Tracy Henderson	\$132,000

Project	Title	Duration	Contact	Funds 2005–06
Strategy D2 Foster targeted continuing education, attraction and retention of human capital throughout the industry value chain				
<i>Continuing Projects</i>				
AFF002	Science and Innovation Awards for Young People	Mar-03–Sep-08	Ms Tracy Henderson	\$14,000
BSS274	Sugarcane-oriented quarantine training program	Jul-04–Sep-05	Dr Mohamed Sallam	\$1,000
BSS279	Improving extension capacity	Jul-05–Aug-06	Mr Dale Chapple	\$4,000
RDA001	Innovator and R&D Awards	Jul-03–May-08	Mr Neale Price	\$12,000
RDA003	APEN Leadership in Extension: Nurturing young leaders workshop	Apr-05–Apr-06	Ms Tracy Henderson	\$0
STU039	E Meier — The availability of nitrogen in GCTB soils in the wet tropics and its impact on productivity and profitability	Mar-01–Jan-06	Dr Mal Wegener	\$0
STU041	C Ngo — Molecular analysis of suckering and tillering in sugarcane	Jul-02–Jul-05	Dr Christine Beveridge	\$0
STU042	K Ritter — An investigation of the genetic, biochemical and molecular basis of sugar accumulation in sugarcane	Mar-02–Jan-06	Dr Ian Godwin	\$4,833
STU049	P Wulf — Self-regulatory codes of practice & their effectiveness in achieving best environmental management practices within NQ primary industries	Jul-03–Jul-06	Prof Geoff McDonald	\$29,000
STU050	Mira Durr — Microbiology of acid sulfate soils in agricultural environments	Mar-04–Jan-07	Prof Ian White	\$32,000
STU051	Brendan Dyer — An integrated pest management strategy for climbing rat in the far-north Queensland sugarcane production system	Jan-05–Jan-08	Dr Peter Allsopp	\$46,000
STU052	Kylie Anderson — Invasion potential of <i>Eumetopina flavipes</i> , vector of Ramu Stunt Disease of Sugarcane	Jun-05–Jun-08	Dr Bradley Congdon	\$24,493
STU053	Su Yin Tan — Studies on bagass fractionation using ionic liquids	Mar-05–Mar-08	Prof Doug MacFarlane	\$32,000
STU054	M James — Integrating the harvest, transport and milling value chain by implementing a novel data infrastructure and decision support	Jun-05–Jul-08	Dr Duncan Campbell	\$16,000
WS013	Project design and evaluation workshops	Dec-04–Feb-06	Ms Tracy Henderson	\$7,348

Project	Title	Duration	Contact	Funds 2005–06
<i>New Projects</i>				
AU002	Participate in the international conference on lepidopterous stemborers	Oct-05–Dec-05	Ms Katherine Muirhead	\$3,000
CPI010	Accessing international expertise in sugarcane biotechnology	Jul-05–Oct-06	Dr John Manners	\$9,000
CPI011	Participation in Plant and Animal Genome XIV Conference, January 14–18, 2006	Nov-05–Mar-06	Dr Rosanne Casu	\$2,455
CSE015	Nitrogen management controls in the EU and USA — lessons for the Australian Sugar school at Hawksbury	Oct-05–Apr-06	Dr Peter Thorburn	\$4,770
CSR034	Travel to attend Social Ecology residential school at Hawksbury	Jul-05–Feb-06	Dr Lisa McDonald	\$1,500
SRI145	The 2006 Appita Conference — value adding of bagasse	Mar-06–Apr-06	Mr Tom Rainey	\$3,295
STU055	New scholarship from January 2006	Jan-06–Jul-09		\$16,000
STU056	New scholarship from January 2006	Jan-06–Jul-09		\$16,000
STU057	New scholarship from January 2006	Jan-06–Jul-09		\$16,000
STU058	New scholarship from January 2006	Jan-06–Jul-09		\$16,000
Strategy D3 Promote safe healthy workplaces through the adoption of appropriate OH&S work practices				
<i>Continuing Projects</i>				
OHS002	Farm Health and Safety R&D Program 2002–2006	Jul-02–Sep-06	Mr Neale Price	\$20,000
Strategy D4 Promote more effective coordination of R&D activities across industry and R&D providers, and enhance the performance of the R&D system through evaluation, review, and feedback				
<i>Continuing Projects</i>				
FMS005	FMS program 5. Evaluation of FMS	Nov-04–Mar-07	Dr Lisa McDonald	\$14,409
SRI140	Documenting changes in the performance of the Australian sugar industry milling sector 2003–2008	Jan-05–Jan-07	Mr Geoff Kent	\$0
WS009	Assessment of regional R&D needs and opportunities	Jul-03–Jun-08	Mr Neale Price	\$55,000
<i>New Projects</i>				
SRD003	Industry Capacity Building Workshop	Jul-05–Sep-05	Ms Tracy Henderson	\$25,000
Total for Program D				\$1,759,155

ATTACHMENT B

ORGANISATIONAL IDENTIFIERS IN PROJECT CODES

Project Codes Organisation

AFF	Department of Agriculture, Fisheries and Forestry
AGX	Agtrix Pty Ltd
AU	Adelaide University
BSS	BSES Limited
CG	Canegrowers
CPI	CSIRO Plant Industry
CRC	CRC for Sugar Industry Innovation through Biotechnology
CSE	CSIRO Sustainable Ecosystems
CSR	CSR Sugar Ltd
CVA	Managing Climate Variability Program
DHC	Rural R&D Corporations Developing Human Capacity Program
DPI	Queensland Department of Primary Industries and Fisheries
FMS	Farm Management Systems initiative
ICB	International Consortium for Sugarcane Biotechnology
IBS	Innisfail-Babinda Cane Productivity Services Limited
JCU	James Cook University
LDI	Leading Industries
MAS	Mossman Agricultural Services
MSA	Mackay Sugar Cooperative Association
NSC	New South Wales Sugar Milling Cooperative Ltd.
OHS	Rural R&D Corporations Farm Health & Safety Program
ORC	Ord River Canegrowers
PCS	Plane Creek Productivity Services
RDA	SRDC Awards
SRD	SRDC-Managed activities
SRI	Sugar Research Institute
STU	SRDC Student Scholarships
UNW	University of New South Wales
UQ	The University of Queensland
WAA	Western Australia Department of Agriculture
WS	Workshops
YDV	Yield Decline Joint Venture

ATTACHMENT C

ABBREVIATIONS AND ACRONYMS

ACFA	Australian Cane Farmers' Association
ACGC	Australian Cane Growers' Council
AOP	Annual Operational Plan
AQIS	Australian Quarantine Inspection Service
ASMC	Australian Sugar Milling Council
ASSCT	Australian Society of Sugar Cane Technologists
BPMS	Business Process Management System
BSES	BSES Limited
CAC Act	Commonwealth Authorities and Companies Act 1997
CCS	Commercial Cane Sugar
CRC	Cooperative Research Centre
CRC SIIB	CRC for Sugar Industry Innovation through Biotechnology
CSIRO	Commonwealth Scientific and Industrial Research Organisation
FMS	Farm Management Systems
GGIP	Grower Group Innovation Projects
HGIP	Harvester Group Innovation Projects
IPM	Integrated Pest Management
NSWSMC	New South Wales Sugar Milling Cooperative
PIERD Act	Primary Industries and Energy Research and Development Act (1989)
QDPI	Queensland Department of Primary Industries and Fisheries
R&D	Research and Development
RDC	Research and Development Corporations
SRDC	Sugar Research and Development Corporation
SRI	Sugar Research Institute
SYDJV	Sugar Yield Decline Joint Venture
TLOP	Travel and Learning Opportunity Project