



SUGAR RESEARCH AND DEVELOPMENT CORPORATION
Annual Operational Plan 2003.....2004



Department of Agriculture, Fisheries and Forestry.....Australia

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1. INTRODUCTION

Section 25 of the *Primary Industries and Energy Research and Development Act 1989* (the PIERD Act) requires that the Sugar Research and Development Corporation develop and prepare a written Annual Operational Plan.

This Plan is required to set out the broad groupings of eligible activities that the Corporation proposes to fund in that year. The Plan must also describe the extent to which these activities address the Corporation's Research and Development Plan 2003–2008.

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*.

The Australian sugar industry produces raw and refined sugar from sugarcane. While on average it produces only 4% of the world sugar supply, it exports approximately 11% of the sugar traded worldwide and its net income from sugar sales in 2002–03 was approximately \$1.4 billion.

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.

It is the intention of the Commonwealth 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.

SRDC is a statutory authority with a mission to foster an innovative and sustainable Australian sugar industry through targeted investment in research and development.

In August 2002 SRDC advertised nationally for preliminary project proposals for funding to commence in 2003–04. Following consideration of new project proposals by the Board and discussions with the relevant research institutions, the final portfolio of projects was consolidated by SRDC for submission to the Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry in this Annual Operational Plan.

R&D Plan 2003–2008

This Annual Operational Plan is the first 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 new 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 current state of the industry, while continuing to look to the health and sustainability of the industry in the longer term.

Major Thrust

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.

Allocation of SRDC funding between Programs has changed with greater emphasis being placed on the Value Chain Integration and Industry Capacity Programs. A major focus will be on participative implementation of whole-of-system solutions to benefit industry participants and the broader community.

The Plan is consistent with the major thrust of the Sugar Industry Reform Program which also addresses both short-term and longer-term needs of the industry.

Change in Emphasis

SRDC consulted widely with industry and government stakeholders prior to developing this Plan. The focus of the previous R&D Plan was primarily disciplinary, and gave greater prominence to the individual components rather than the relationships between components within the value chain. By 2001, however, it had become increasingly clear that this component approach alone would not sustain industry futures, and that a more systems-based approach was required if SRDC was to effectively address the emerging priority R&D issues.

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

The Plan has a four-Program structure compared with the eight-Program structure of the previous largely disciplinary-based Plan. The new structure will ensure better integration of research and lead to the delivery of enhanced economic, environmental and social benefits to the sugar industry and its broader associated community.

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 a Commonwealth 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
- Australian Cane Farmers' Association Limited
- Australian Sugar Milling Council Proprietary Limited

SRDC is accountable to both the Commonwealth 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 2003–04 in relation to these consultations or for any other purpose apart from the conduct of R&D projects.

2.4 Responsible Minister — Ministerial power of direction

SRDC is responsible to the Federal Parliament through Senator the Hon. Judith Troeth, 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 Management Framework

2.5.1 Corporate Structure

Key Stakeholders: Commonwealth Government, ACGC, ACFA, ASMC



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 2 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 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 which incorporates SRDC's quality and continuous improvement mechanism.

3. OPERATING ENVIRONMENT

3.1 R&D Environment

Total funds available for sugar industry R&D in 2002–03 were estimated in October 2002 to be \$46 million, of which 40% was contributed by the industry. This total consisted of \$10.65 million provided by SRDC, \$26.70 million from R&D providers including the industry R&D organisations BSES, SRI and Cane Protection and Productivity Boards, and \$8.90 million from other sources.

A combination of events including a low sugar price, poor seasons in two of the past three years (resulting in lower levy payments to SRDC) and cessation of the special Commonwealth funded program CP2002 in 2002–03 have resulted in a reduction in SRDC funds of approximately \$5 million. The commencement of the new CRC for Sugar Industry Innovation through Biotechnology in July 2003 will provide a new source of funding for industry R&D, but the CRC for Sustainable Sugar Production will conclude in June 2003.

In this funding environment, the sugar industry and SRDC in particular face four key challenges over the next two to three years 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 do not have a substantial domestic market for a large proportion of their production. Brazil, in particular, has increased its exports ten-fold over the past six years to more than 10 million tonnes (compared with Australia's total production of 5 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 most difficult period in a decade with low sugar prices threatening industry viability. In responding to this threat, 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 Commonwealth Government, R&D organisations, agribusiness and the rural and regional communities in sugar-growing areas.

3.3 Stakeholder R&D Priorities

In developing its new 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
- Commonwealth 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.

3.3.1 Industry Priorities

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.

3.3.2 Commonwealth Government 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. The following sections firstly outline SRDC's activities in 2003–04 to address the rural R&D priorities, and then provide additional comments which relate these activities to the National Research Priorities.

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.

Several continuing projects in 2003–04 will focus on the use of water resources in the irrigation areas of Queensland and the Ord River district in Western Australia, to ensure that water resources are used most efficiently and with minimal impact on soil resources and water table levels. A four year project on improved floodgate management in northern NSW, funded in collaboration with LWA and ASSPRO, will conclude with the publication of comprehensive guidelines on management of floodgates to deliver improved fish habitat without impacting negatively on agricultural productivity.

The outputs of Phase 2 of the Sugar Yield Decline Joint Venture are having a substantial impact on soil health and sugarcane productivity through improved biological diversity and reduced compaction. Many of the long-term rotation experiments will conclude in 2003–04 and there will be a greater emphasis on implementation of findings. A related project will focus on the selection of new soybean varieties as rotation crops in the sugarcane farming system.

SRDC has supported many initiatives in recent years aimed at optimal fertiliser management with minimal losses of nutrients off-farm. In 2002–03, SRDC funded a review of nitrogen fertiliser R&D in the Australian sugar industry. The final report of this review will be delivered early in 2003–04 and further action, based on the recommendations of the review, will be determined. Two current projects on amelioration of acid and sodic soils will conclude in 2002–03 and 2003–04 respectively, and their recommendations will be promoted to the farming sector of the industry in 2003–04.

Several projects directed at minimising impacts of the sugar industry on water quality concluded in 2002–03, and SRDC will be assisting researchers to ensure that recommendations

of these projects are widely publicised. Early in 2003–04, SRDC will conduct a workshop to assess gaps in knowledge, and priorities for future R&D in this area.

Several recently completed projects documented best practice for a range of management procedures including variety selection, pest control and harvesting. SRDC is now collaborating with the BSES PROSPER program to ensure that the momentum of grower groups is maintained through a systems approach to best management practice in which all practices are evaluated for triple bottom line benefits, and best practice is promoted through participative involvement by growers. A related project is co-ordinating workshops to promote farm business management, and another is focussing on decision support systems for management of greyback canegrub, the sugar industry's most damaging insect pest.

SRDC has agreed to participate in the proposed Managing Climate Variability Program to be co-ordinated by LWA. SRDC was a partner in the predecessor Climate Variability in Agriculture Program which delivered benefits to the sugar industry through better planning of farming and harvesting operations. In addition, a new project to begin in 2003–04 will be assessing means of moving from case studies to broad industry implementation of new technology, and will use climate forecasting as one of several model technologies.

Three new projects will begin in 2003–04 which will support regional approaches to industry sustainability, in which natural resource management will be a key component of a systems-based triple bottom line approach. In Mossman, a regional partnership with a broad range of industry and community stakeholders will enhance adoption of best practice in cane production, including by accreditation of "eco-efficient" farmers, and supporting tree planting as part of the Douglas Shire Sustainable Futures Strategy. In Tully, SRDC will facilitate the development of a regional vision and planning process for regional sustainability through a viable sugar industry. In NSW, an industry system based around whole of crop harvesting to support cogeneration will be evaluated, which will necessitate modified farming, harvesting, transport and milling systems and will contribute to renewable energy production.

Improving competitiveness through a whole of industry approach

SRDC's Whole-of-Industry Program, renamed Value Chain Integration in the R&D Plan 2003–2008, will be given substantially increased funding over the life of the Plan compared to the previous Plan period.

Continuing projects in 2003–04 will focus on several opportunities to add value through integrated action across the value chain. In particular, previous work has identified the potential for sustainable economic improvements through rethinking harvest and transport scheduling using systems modelling tools. Current projects are applying these tools in case study mill areas, and developing new models to integrate knowledge of geographical harvesting, causes of cane and sugar losses, transport schedules and numbers of harvest and transport units. A new project will assess market signals related to harvesting best practice and develop options for improved payment systems to address economic, environmental and social objectives. SRDC will conduct a workshop on harvesting systems in May 2003 which will identify pathways to adoption of improved harvesting and payment systems, and these will be pursued in 2003–04. In addition, two continuing projects are focussing on improved design of

cutting and feeding systems of cane harvesters in order to reduce losses of cane and sugar in the field and to reduce the extraneous matter content of cane entering the mills.

Another new project in 2003–04 will develop and evaluate 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.

A project has been evaluating impacts of elements of the value chain on whole of industry competitiveness through investigation of genetic and agronomic management approaches to control of ash and colour levels in raw sugar. This project will conclude in 2003–04 and recommendations will be communicated to industry.

Work on predicting the impact of weather on polysaccharide impurities will also conclude and will lead to refinement of factory and storage processes. Other aspects of improved sugar quality will also be addressed through improvements to factory-based processes for juice separation, clarification, evaporation and crystallisation.

Improved yield forecasting will facilitate farm, harvest, factory and marketing arrangements. A continuing project will integrate climate forecasting, remote sensing and crop modelling approaches.

Diversification of production is being addressed in several initiatives, particularly through the new CRC for Sugar Industry Innovation through Biotechnology (CRC SIIB — see later under Frontier Technologies). In addition, studies on extraction and fermentation technologies are expected to lead to improved processes for production of foodstuffs, nutraceuticals and feedstocks such as ethanol.

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. One project concluding in 2002–03 has developed strategies to minimise the presence of pathogens such as *Legionella* in mill cooling towers and spray ponds, and adoption of the results will be promoted to sugar mills in 2003–04. The primary risk of these organisms is to the health of mill staff rather than to contamination of sugar products.

Other projects concluding in 2002–03 have enhanced the utility of biological control of canegrubs through the commercial product BioCane, which is based on the *Metarhizium* fungus, or have assisted with data on residues for the registration of new insecticides. These initiatives will be promoted in 2003–04 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.

Improved trade and market access

SRDC contributed to the production of the ABARE report "Sugar: Integrated Policies Affecting Market Expansion" which contributed significantly to the new round of WTO negotiations which began in 1999–00.

In 2003–04, SRDC will support a study to be jointly funded by the sugar industries of Australia, Brazil and Thailand, to contribute to the WTO Doha Round of negotiations. The study will provide data on costs of production to support requirements for establishing a precedent of the WTO Canada Dairy Appellate Body decision.

Use of frontier technologies

SRDC was a core party to the successful bid for a new CRC for Sugar Industry Innovation through Biotechnology, which will commence on 1 July 2003. SRDC has committed \$4.9 million of project funding over seven years to the CRC, and in 2003–04 will fund approximately \$250,000 in continuing projects transferred into the CRC and \$400,000 in new projects. The CRC will have two core research programs: Increased and environmentally sustainable sugarcane productivity; and Developing the sugarcane biofactory for high-value biomaterials. The 14 parties to the CRC include all R&D organisations currently involved in sugarcane biotechnology in Australia, several milling companies, and commercial partners DuPont and Farmacule Bioindustries which will ensure a pragmatic focus to the R&D and rapid commercialisation pathways.

The new CRC will build on the foundation of biotechnology R&D in the sugar industry which has been strongly supported by SRDC over several years. SRDC funding has developed enabling technologies in transformation, genomics, and molecular markers, and identification of genes for insect and disease resistance, and improved sugar content. Several current biotechnology projects will conclude during 2003–04 and their outputs will be used as background technology in the CRC.

SRDC also supports several projects through the International Consortium for Sugarcane Biotechnology which are focussing on gene discovery and enabling technologies relevant to sugarcane biotechnology worldwide.

SRDC will sponsor a workshop on sugarcane physiology in September 2003, which will link advances in plant, cell and molecular physiology with new approaches to the understanding of field crop adaptation through physiological mechanisms, including the use of advanced crop models.

SRDC recognises the importance of robust production systems with sustainable levels of productivity and profitability. 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. The R&D Plan 2003–2008 is targeting closer integration of conventional and biotechnological approaches to the breeding of sugarcane varieties. Continuing projects in 2003–04 will address both improved breeding and selection methodologies, and breeding for elite traits, including increased sugar content and resistance to pests and diseases.

SRDC is also investing in strategic technologies for enhanced processing of sugarcane, including computational models to deliver innovative options for redesign of milling processes, and new materials to reduce capital investment and maintenance costs in mills.

Protecting Australia from invasive diseases and pests

SRDC has 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 SRDC-funded program of screening sugarcane varieties and advanced clones in Indonesia for resistance to sugarcane smut will be significantly expanded in 2003–04 following negotiation of a new contract between BSES and the Indonesian Sugarcane Research Institute. This program began prior to the discovery of sugarcane smut in the Ord River district of Western Australia in July 1998, but has assumed greater significance since then.

A previous SRDC-funded project identified stem borers as the greatest exotic insect threat. A current project is developing incursion management plans for several species of borers, which are serious pests of sugarcane in Papua New Guinea and South-east Asia.

A long-term project funded in collaboration with several other commodity groups is also developing diagnostic tools for nematodes, and will release a major publication on nematode taxonomy, identification and management in 2003–04.

Creating an innovative culture

One of the four programs in the SRDC R&D Plan 2003–2008 is specifically devoted to enhancing the capacity for innovation. The goal of the Industry Capacity program is to build human capacity for change, learning and innovation in the sugar industry and this program was one of the two primary targets of SRDC's call for new proposals for 2003–04.

Significant new initiatives in 2003–04 will support leadership development programs in collaboration with CSR Sugar Ltd, which will target key personnel across the farming, harvesting, milling, management and R&D sectors of the industry. SRDC will also sponsor a workshop facilitated by experienced QDPI personnel to deliver principles, processes and tools of continuous improvement and innovation to industry service providers who are at the forefront of participatory improvement initiatives in the farm sector. Participants will be supported in conducting a specific learning activity over the following 12 months.

SRDC will support an investigation into the demand for and key features of training packages for business management and sugarcane production at Australian Qualifications levels IV and above. Course material at this level is limited and this study will evaluate the potential value of developing courses at this level.

SRDC will support travel by industry research and extension staff to several national and international conferences in 2003–04, including the Australian Farming Systems Conference, the annual conference of the Australian Society of Sugarcane Technologists (ASSCT), the ISSCT Entomology Workshop and the International Conference on Assimilate Transport and Partitioning. A young farmers group from the Herbert region will travel to southern Queensland and northern NSW to examine industry practices in those areas.

SRDC will contribute to several initiatives in partnership with AFFA and other Rural R&D Corporations, including the AFFA Corporate Governance for Rural Women Program and the Science and Innovation Awards for Young People, and the RDC Joint Venture on Capacity Building for Innovation in Rural Industries.

SRDC requires all R&D project proponents to consider implementation of outcomes in the design and evaluation of projects, and conducted a workshop in December 2002 to assist investigators to integrate adoption and evaluation into project design. This initiative will be repeated in December 2003. Two specific projects to assist the delivery of factory technology developed by SRI will also be funded, as well as the project described earlier, which is examining means of enhancing industry-wide adoption of new technologies.

SRDC will conduct an outcomes analysis of selected projects funded through both PIERD and CP2002 budgets, in order to identify economic, environmental and social benefits and to determine quantifiable cost/benefit multipliers.

SRDC will continue its Honours and Postgraduate scholarship program in 2003–04, which will support ten continuing postgraduate scholars and two continuing honours scholars, with provision for two new postgraduate scholarships and two new honours scholarships from January 2004. SRDC will also participate in the Innovator of the Year Award (with QSL) 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.

National Research Priorities

An environmentally sustainable Australia

A key initiative early in 2003–04 will be the water quality workshop to be conducted by SRDC. This workshop will lay the foundation for activities to implement available information to minimise the impact of the sugar industry on waterways including the Great Barrier Reef lagoon, and will also identify future R&D necessary to underpin the sustainability of the sugar industry and the surrounding environment. Another key activity will be three new regional initiatives, in which natural resource management will be an integral component of a systems-based triple bottom line approach to industry and regional sustainability. Other SRDC initiatives in 2003–04 have been outlined under Sustainable natural resource management in the previous discussion of the rural R&D priorities. They will include projects addressing efficient use of irrigation water, protection of water quality, enhanced soil health and nutrient management, best practice farming in a systems context with economic, environmental and social benefits, managing climate variability, and regional approaches to industry sustainability.

Promoting and maintaining good health

SRDC will continue to participate in the joint RDC program on Farm Health and Safety which runs until 2005–06. One project in this program has examined health and safety issues on sugarcane farms, and the recommendations of that project will be finalised and promoted in 2003–04. Several other projects conducted by the joint program will also be relevant to sugar growers. Other initiatives in relation to the integrity of food products were outlined in the corresponding section of the rural R&D priorities.

Frontier technologies for building and transforming Australian industries

The new CRC for Sugar Industry Innovation through Biotechnology is a major initiative with the potential to rejuvenate the sugar industry and contribute strongly to the national economy through elite sugarcane varieties that can produce specialist materials such as bioplastics, oligosaccharides, enzymes and pharmaceuticals. SRDC's other initiatives in frontier technologies in 2003–04 were outlined in the corresponding section of the rural R&D priorities.

Safeguarding Australia

The sugar industry places a high priority on protection of the industry and the associated economy from the potentially devastating impacts of invading pests and diseases, particularly 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. Details of SRDC's initiatives in protecting the sugar industry from invasive diseases and pests were outlined in the corresponding section of the rural R&D priorities.

3.4 SRDC Priorities

The SRDC R&D Plan 2003–2008 lists the following SRDC priorities which have been developed from consideration of the R&D needs to address industry and government priorities.

- Improved sugar yield per cultivated hectare through improved varieties, cropping systems, and harvest practices
- Cost-efficient value chain management and capital utilisation through integrated and optimised harvest and transport, milling, and marketing processes.
- More accountable environmental practices across the industry through an enhanced focus on environmental issues
- Diversification through the development of alternative products from sugarcane and sugar.
- Improved farm profitability through enhanced business and farm management practices.
- Improved industry performance through increased uptake and implementation of R&D outputs and technologies.
- Improved and more urgent attention to change management driven by an industry-wide acceptance of the need for transformational change.
- Enhanced capacity for continuous improvement through the development of human capital throughout the industry
- Enhanced decision making and management of risk across the entire value chain through improved measurement and monitoring systems

3.5 SRDC Investment for 2003–04

In keeping with the main needs identified by industry, the SRDC Board agreed to target new R&D investment in 2003–04 in two high priority areas. These are:

- Facilitation of change which promotes adoption of whole of system solutions to enhanced revenue, cost efficiency and environmental and social sustainability across the value chain, particularly at mill area and regional levels.

R&D in this area should lead to a step change in industry performance through:

- Developing and implementing regional action plans to underpin the industry's transition to the future.
 - Implementing integrated harvesting and transport systems.
 - Developing optimal structures and policies that increase whole of industry profitability.
 - Engaging the community in developing whole of systems approaches to sustainability.
- Enhancement of human capacity and partnerships between industry, research and regional communities for change, learning and innovation.

These two priority areas fall within SRDC's Value Chain Integration and Industry Capacity Programs, respectively.

The total investment in projects in 2003–04 is \$7.9 million from new (\$2.45 million) and continuing projects (\$5.45 million). The proportionate spread across SRDC's four Programs is indicated below:

Program	2003–04 Investment Allocation (%)
Value Chain Integration	20
Farming Systems	50
Processing & Distribution Systems	16
Industry Capacity	14
Total	100

The focus on the Value Chain Integration and Industry Capacity Programs for new projects in 2003–04 will provide a more balanced portfolio for SRDC. As indicated in the table, a significant investment will be maintained in 2003–04 in the Farming Systems and Processing and Distribution Systems Programs through continuing projects. It is expected that new projects will be sought across all four Programs in 2004–05.

The investment allocation to Farming Systems also includes the significant SRDC contribution to the recently approved CRC for Sugar Industry Innovation through Biotechnology.

3.6 *Public Good R&D*

Benefits to the broader community, including benefits beyond the sugar industry, will be a major outcome from more than 48% of the projects included in this AOP.

Projects delivering benefits to the broader community include 6 projects in Program B which aim to minimise the impact of the sugar industry on other ecosystems. A further 9 projects (15% of the portfolio) in Programs A, B, C and D are aimed at preventing or ameliorating degradation of the natural resource base within sugar production sectors, or providing benefits to the wider community through contributions to training, communication and health and safety. These include projects to develop varieties resistant to pests and diseases, to develop integrated pest management systems and reduce pesticide use, to make more efficient use of the water resource, to develop reduced tillage systems and to ameliorate soil sodicity.

Fourteen projects (23% of the portfolio) in sugarcane production and sugar manufacturing systems will also provide benefits beyond the Australian sugar industry. These are strategic research projects in the areas of genetic introgression, crop physiology, biotechnology, data analysis, plant pests and diseases, and various fundamental studies in milling operations.

The sugar industry contributes to regional economic development and the sustainability of rural communities in coastal Queensland and northern NSW, and in northern WA. SRDC's provision of sugar industry R&D provides direct economic, environmental and social benefits to those communities and beyond them to the broader Australian community.

4. OUTCOMES AND OUTPUTS

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 also describes the following specific outcomes which SRDC will work with its stakeholders to deliver during the Plan period:

- *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.

4.2 SRDC Outputs

The four program structure of the R&D Plan 2003–2008 was introduced in SRDC's AOP for 2002–03. In this AOP the SRDC outputs have been reworded to better describe the overall output from each of the programs at the system level.

Figure 1 shows the contribution of the four outputs to SRDC's overall outcome in 2003–04.

FIGURE 1 — RELATIONSHIP BETWEEN OUTCOMES AND OUTPUTS IN 2003–04

Sugar Research and Development Corporation

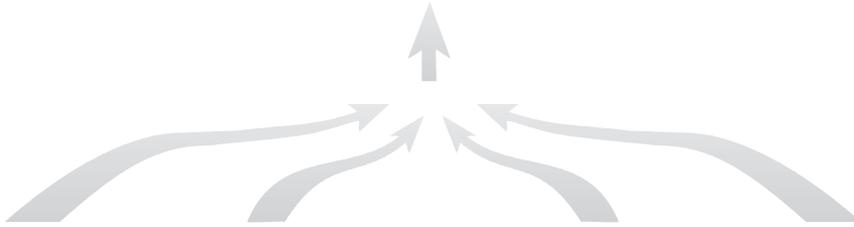
Chairperson: Mr Robert Granger
 Executive Director: Dr Russell Muchow

Outcome

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

Total Revenue From Independent Sources: \$10.039m

Total Cost of Outputs: \$9.903m



Output 1: (Program A)

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

Output 2: (Program B)

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

Output 3: (Program C)

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

Output 4: (Program D)

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

Total Cost: \$1.988m (03–04)
\$0.593m (02–03)

Total Cost: \$4.953m (03–04)
\$5.539m (02–03)

Total Cost: \$1.594m (03–04)
\$2.366m (02–03)

Total Cost: \$1.368m (03–04)
\$0.778m (02–03)

4.3 Outcome — Resourcing

The total revenue for SRDC including industry levies and the Commonwealth contribution, and total expenditure for the SRDC outcome is shown in Table 1. Comparable figures for 2002–03 are included for comparison.

TABLE 1 2003–04 SRDC BUDGET

	\$m 2002–03	\$m 2003–04
Estimated Crop Size (cane)	38.5 mt	36.3 mt
Levy rate/tonne	\$0.14	\$0.14
INCOME		
Industry Contribution	5.391	5.079
Commonwealth Contribution	4.315	4.800
CP2002	0.179	–
Interest/Other	0.160	0.160
TOTAL INCOME	10.045	10.039
EXPENDITURE		
PIERD PROGRAM		
Continuing Projects	7.261	5.453
New Projects	1.545	2.454
Contingency for Projects	0.129	0.300
TOTAL PROJECTS	8.935	8.207
Research Administration	0.450	0.469
Operation of SRDC	1.096	1.168
Capital	0.045	0.059
TOTAL PIERD	10.526	9.903
EXPENDITURE CP2002 — Continuing Projects	0.119	–
TOTAL EXPENDITURE	10.645	9.903

The distribution of SRDC funds among its major research providers is presented in Table 2.

TABLE 2 PROPOSED SRDC EXPENDITURE BY RESEARCH ORGANISATION AND OTHER ACTIVITIES 2003–04
(EXCLUDES CONTINGENCY)

	\$m	%
BSES	3.536	37
SRI	0.689	7
CSIRO	1.777	19
Universities	0.407	4
State Government	0.038	0
Private Organisations	0.746	8
Other Providers	0.714	7
Other Activities	1.696	18
TOTAL	9.603	100

4.4 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 in excess of a benefit:cost ratio of 5:1	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 Commonwealth 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 2003–04 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> Accountability to SRDC of its research providers measured by:</p> <ul style="list-style-type: none"> • Unapproved carryovers at end of financial year (milestones not submitted or accepted) equivalent to less than 2% of budget. Accountability is also achieved through monitoring project milestones, financial reporting requirements and reviews to ensure delivery of output • At least two reviews completed in Outputs 2, 3 and 4 and one review completed in Output 1.
<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>	<p><i>Quantity:</i> 9 new and 5 continuing contracts (projects) <i>Price:</i> Average of \$112,906 per project</p>
<i>Output 2 — Sustainable sugarcane production systems based on integrated management of resources at farm level.</i>	<p><i>Quantity:</i> 3 new and 42 continuing contracts (projects) <i>Price:</i> Average of \$89,870 per project</p>
<i>Output 3 — Flexible, cost-effective systems for sustainable harvest, transport, milling and marketing based on innovative design.</i>	<p><i>Quantity:</i> 4 new and 16 continuing contracts (projects) <i>Price:</i> Average of \$66,485 per project</p>
<i>Output 4 — Enhanced human capacity for change, learning and innovation in the sugar industry.</i>	<p><i>Quantity:</i> 10 new and 8 continuing contracts (projects) and 4 new and 12 continuing scholarships <i>Price:</i> Average of \$40,403 per project and an average of \$14,010 per scholarship</p>

5. EXTENT TO WHICH ANNUAL OPERATIONAL PLAN GIVES EFFECT TO THE R&D PLAN

5.1 Allocation of Resources Across Programs

As stated in its R&D Plan 2003–2008, in difficult times and with limited resources, SRDC believes that greater short term gains in industry performance are available through integrating existing knowledge towards whole-of-system solutions than are available through new R&D investment into component research. This thinking is reflected in the proposed shift in resources across programs as indicated in Table 5.

TABLE 5 PROPOSED ALLOCATION OF RESOURCES ACROSS PROGRAMS AND ACTUAL ALLOCATION FOR 2003–04

Program (Output)	Indicative Allocation in R&D Plan 2003–2008 (%)	Actual 2001–02 to 2002–03 (%)	Actual 2003–04 (%)
A (1) Value Chain Integration	20–25	9	20
B (2) Farming Systems	45–50	60	50
C (3) Processing and Distribution Systems	15–20	21	16
D (4) Industry Capacity	10–15	10	14

The actual proportions of funding applied to the four Programs are within the ranges indicated in the R&D Plan.

5.2 Addressing Strategies of the R&D Plan

The strategies within the four Programs of the R&D Plan, together with a listing of new and continuing projects, are listed in Attachment A. The proposed allocations to projects in 2003–04 address all strategies in Programs A, B and C and all except the fifth strategy in Program D. The fifth strategy in Program D, “Develop systems analysis skills of people within the industry”, will be addressed within several capacity building projects, and also by workshops and project reviews.

6. R&D ACTIVITIES IN 2003–04

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 2003–04

Projects to be funded in 2003–04 will target decision-making at 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. In addition, improvements will be sought to yield forecasting to enhance marketing strategies for the sugar industry. Four new projects will support partnerships and planning to enhance socio-economic and environmental performance at regional and mill area levels. New projects will also evaluate a whole of industry predictive modelling capacity to assist industry to explore alternative cost-effective production systems, and assess market signals related to harvesting best practice and develop options for improved payment systems. Another new initiative will develop methods for industry-wide implementation of new technologies.

Strategies

The strategies addressed in 2003–04, together with the projects funded within them, are listed in Attachment A.

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 best practice 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 adoption 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 2003–04

Projects to underpin sustainable farming systems will seek to amend inherent soil sodicity, develop more sustainable irrigation practices and promote the adoption of best management practices and farm business management skills. SRDC will contribute \$0.65 million to the CRC for Sugar Industry Innovation through Biotechnology in addition to funding projects to develop improved varieties with pest and disease resistance and improved sugar content, through both conventional and biotechnology approaches. Integrated solutions for sustainable production will be sought through the development and promotion of practices to restore soil health and foster integrated pest management.

Strategies

The strategies addressed in 2003–04, together with the projects funded within them, are listed in Attachment A.

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.

Significant 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 2003–04

Projects funded in 2003–04 aim to enhance the capability in processing and distribution systems in addition to developing innovative technologies and best management practices. These include improved harvester design, reduced factory maintenance costs and improved milling, clarification crystallisation and sucrose recovery processes in raw sugar factories. Diversification of the income stream will also be investigated through extraction of natural products of sugarcane and through investigation of high yield ethanol production, and through projects to be developed by the new CRC for Sugar Industry Innovation through Biotechnology.

Strategies

The strategies addressed in 2003–04, together with the projects funded within them, are listed in Attachment A.

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 2003–04

Projects to enhance people's capacity to learn and change in 2003–04 include the development of corporate governance skills in rural women and the ongoing development of industry leadership skills. In addition, SRDC will fund 14 postgraduate and honours 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 QSL) and will offer the SRDC Research/Extension and Service to Industry R&D Awards

A workshop to deliver principles, processes and tools of continuous improvement and innovation to industry service providers will be conducted, and SRDC will support an investigation into the demand for training packages for business management and sugarcane production. Two projects to assist the delivery of factory technology developed by SRI will be funded.

SRDC will support travel by industry research and extension staff to several national and international conferences. In addition, a young farmers group from the Herbert region will travel to southern Queensland and northern NSW to examine industry practices in those areas.

Strategies

The strategies addressed in 2003–04 together with the projects funded within them, are listed in Attachment A.

ATTACHMENT A

PROJECTS AND SCHOLARSHIPS IN 2003–04

Project	Title	Duration	Contact	Funds 2003–04
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>				
CPI003	Integrated management of ash and colour in the field	Jul-00–Sep-03	Dr Phillip Jackson	\$28,768
CSE004	Improving yield forecasting capability to enhance market strategies for the Australian sugar industry	Sep-02–Sep-05	Dr Yvette Everingham	\$159,195
<i>New Projects</i>				
BSS261	Measurement and feedback systems for improving market signals for harvesting.	Jul-03–Jun-06	Mr Trevor Willcox	\$172,437
CSE010	Integrated value chain scenarios for enhanced mill region profitability	Jul-03–Aug-05	Dr Peter Thorburn	\$364,926
CVA002	Managing Climate Variability Program	Sep-03–Sep-07	Dr Barry White	\$35,000
LMC001	Analysis of international sugar prices and production costs	May-03–Jul-03	Mr Warren Males	\$10,130
MAS001	A regional partnership approach to developing a sustainable sugar cane system	Jul-03–Jun-07	Mr Allan Rudd	\$76,715
MSA003	A Cooperative Systems model for the Mackay regional sugar industry.	Jul-03–Aug-05	Mr Geoffrey Fleming	\$155,450
NSC005	Implementing an integrated sugar system in NSW	Jul-03–May-06	Mr Richard Beattie	\$111,000
Strategy A2 Facilitate sustainable whole-of-system change using a cooperative approach across the industry value chain				
<i>Continuing Projects</i>				
CSE003	Adoption pathways for alternative cane supply options across the sugar industry	Jul-02–Jul-05	Dr Andrew Higgins	\$78,844
CSE005	Integrating and optimising farm-to-mill decisions to maximise industry profitability	Jul-02–Jul-06	Dr Andrew Higgins	\$167,772
WS006	Review and workshop on sugarcane harvesting practices	Jan-03–Jul-03	Mr Ewan Colquhoun	\$11,550

Project	Title	Duration	Contact	Funds 2003-04
<i>New Projects</i>				
CG002	Developing the vision of the Tully sugar industry	Jul-03–May-04	Mr Peter Lucy	\$50,000
CSE009	Moving from case studies to whole of industry: Implementing methods for wider industry adoption	Jul-03–Jun-07	Dr Yvette Everingham	\$158,899
Total for Program A				\$1,580,686

Program B Farming Systems

Strategy B1 Develop knowledge, technologies and implementation processes to underpin sustainable farming systems

Continuing Projects

BSS143	Strategic tillage to reduce soil structural degradation and improve productivity	Jul-98–Feb-04	Dr Alan Garside	\$0
BSS197	Products and mechanisms for amelioration of sodic soils	Jul-97–Jul-03	Mr Gary Ham	\$25,000
BSS202	Resource assessment for sustainable land development and management of new canegrowing areas	Jan-99–Jan-04	Ms Kylie Webster	\$22,796
BSS208	Improving planting systems for sugarcane	Sep-98–Jan-04	Mr Brian Robotham	\$44,000
BSS217	Coordinated farm business management for the Australian sugar industry.	Jan-99–Apr-04	Mr Gavin McMahon	\$67,027
BSS249	Preparedness for borer incursion	Jul-00–Sep-03	Dr Peter Allsopp	\$6,000
BSS260	Enhanced delivery of PROSPER to achieve adoption of Best Management Practices in the Queensland sugar industry	Dec-02–Aug-05	Mr Eoin Wallis	\$300,000
CPI005	Adapting soybean for profitable rotations in sugarcane farming systems	Jul-02–Sep-05	Dr Andrew James	\$50,000
CSE001	Increased profitability and water use efficiency through best use of limited water under supplementary irrigation	Sep-00–Sep-05	Dr Geoff Inman-Bamber	\$105,138
CSE006	Review of knowledge of sugarcane physiology and climate-crop-soil interactions	Aug-02–Jan-04	Dr Geoff Inman-Bamber	\$47,275
CSE007	Implementation of irrigation practices for profitable resource efficient sugarcane production in the Ord	Sep-02–Sep-06	Dr Geoff Inman-Bamber	\$111,588

Project	Title	Duration	Contact	Funds 2003–04
CSE008	Review of nitrogen fertiliser research in the Australian sugar industry	Jul-02–Jan-04	Dr Peter Thorburn	\$4,500
NA003	Hydrologic effects of flood gate management on coastal floodplain agriculture — the sugarcane component	Jul-99–Jun-04	Mr Peter Slavich	\$15,687
SAI001	Preparation of a CD Rom library of plant-parasitic nematodes	Oct-98–Aug-03	Dr Jackie Nobbs	\$5,000
WS007	Review of Water Quality Workshop	May-03–Aug-03	Dr Les Robertson	\$20,000

Strategy B2 Improve the genetic performance of the sugarcane plant for increased sugar production in diverse environments and for the generation of new products

Continuing Projects

BSS151	Resistance mechanisms and selection for resistance in sugarcane to sugarcane weevil borer	Jul-95–Dec-03	Dr Nils Berding	\$0
BSS179	Development of a strategy for selection of high-CCS cultivars for high fertility environments in northern Queensland.	Jul-97–Mar-04	Dr Nils Berding	\$25,757
BSS196	Selection and commercial use of early CCS varieties.	Jul-97–Jul-03	Mr Alan Rattey	\$5,000
BSS214	Screening of Australian germplasm for resistance to sugarcane smut.	Jul-98–Mar-04	Mr Barry Croft	\$39,997
BSS231	Development and application of spatial analysis to improve precision in selection trials	Feb-00–Feb-04	Miss Joanne Stringer	\$0
BSS237	Identification of canegrub-resistant transgenic sugarcane lines for commercial evaluation	Jul-99–Jul-03	Dr Grant Smith	\$12,000
BSS250	Improving selection systems and data analysis in sugarcane breeding programs	Jul-00–Jan-06	Dr Xianming Wei	\$105,690
BSS255	Improving the plant breeding selection system for Fiji disease resistance	Jul-02–Dec-05	Mr Barry Croft	\$65,889
BSS256	Reducing the Australian sugar industry's genetic vulnerability to sugarcane smut	Jul-02–Apr-07	Mr Barry Croft	\$73,554
BSS258	Assessing the impact that pathogen variation has on the sugarcane breeding program	Jul-02–May-05	Dr Kathy Braithwaite	\$24,600
CPI002	Functional genomics for enhanced sugar accumulation in sugarcane	Jul-00–Jul-03	Dr John Manners	\$11,484

Project	Title	Duration	Contact	Funds 2003–04
CTA028	Evaluation and re-structuring of regional selection programs to maximise efficiency and speed of cultivar release	Jul-97–Jul-04	Dr Scott Chapman	\$185,004
CTA043	Provision of improved varieties and pathology services for the Ord Sugar Industry.	Jul-98–Jul-03	Dr Phillip Jackson	\$11,291
CTA047	Introgression of new genes from <i>Saccharum officinarum</i>	Jul-99–Jul-04	Dr Phillip Jackson	\$123,625
CTA048	The transfer of high CCS traits from wild relatives to sugarcane using biochemical	Jul-99–Jan-04	Dr Christopher Grof	\$116,409
CTA049	Characterisation and maintenance of the Australian sugarcane mapping populations.	Jul-99–Jan-04	Dr Lynne McIntyre	\$41,570
ICB007	Isolation of sugarcane proteins involved in post-transcriptional gene silencing	Jul-01–Jul-03	Dr Robert Troedson	\$0
ICB008	A sugarcane gene map	Jul-01–Jul-04	Dr Robert Troedson	\$15,000
ICB009	Map-based cloning of a rust resistance gene in sugarcane	Jul-02–Oct-05	Dr Angelique D'Hont	\$14,000
ICB010	Validation of single nucleotide polymorphisms (SNPs) in sugarcane ESTs as useful genetic markers	Jul-03–Jul-04	Prof Robert Henry	\$18,000
ICSB01	ICSB Membership	Jul-03–Jul-03	Dr Robert Troedson	\$4,000
UQ039	Gene control sequences for metabolic engineering in sugarcane	Jul-02–Feb-06	Dr Robert Birch	\$120,000
<i>Strategy B3 Implement integrated solutions for sustainable sugarcane production by using a systems approach to best practice</i>				
<i>Continuing Projects</i>				
BSS254B	Support for core competence in strategic activities conducted by BSES (System B)	Jul-01–Jun-04	Mr Eoin Wallis	\$1,006,180
BSS257	GrubPlan 2: Developing improved risk assessment and decision-support systems for managing greyback canegrub	Jul-02–Jul-06	Mr Warren Hunt	\$139,813
NSC004	Maintaining and enhancing core skills and capabilities within the NSWSMC for a sustainable NSW sugar industry.	Jul-01–Jun-04	Mr Greg Messiter	\$110,000
YDV002	Sugar Yield Decline Joint Venture (Phase 2)	Jul-99–Jun-05	Dr Alan Garside	\$601,256
Other Program B Projects				\$350,000
Total for Program B				\$4,044,130

Project	Title	Duration	Contact	Funds 2003–04
Program C Processing and Distribution Systems				
Strategy C1 Develop enhanced capability in analysing and optimising processing and distribution systems				
<i>Continuing Projects</i>				
BSS252	Enhancing cane harvester design for optimum feeding performance when harvesting heavy lodged crops	Jan-01–Jun-04	Mr Rod Davis	\$94,103
BSS254C	Support for core competence in strategic activities conducted by BSES (System C)	Jul-01–Jun-04	Mr Eoin Wallis	\$412,390
SRI095	Fundamental studies on the chemistry of clarification	Jul-99–Sep-03	Dr William Doherty	\$30,000
SRI122	The functional relationship between juice properties, operating conditions and heat transfer in Roberts evaporators	Jul-02–May-04	Dr Darrin Stephens	\$60,000
SRI123	Crystallisation studies in a pilot batch vacuum pan	Jul-02–May-04	Dr Ross Broadfoot	\$120,000
SRI129	Enhanced batch pan design through application of computational models	Aug-02–Jun-04	Mr Darryn Rackemann	\$24,000
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>				
CTA034	Predicting the incidence and magnitude of polysaccharide impurities and identifying the causal field-factors	Jul-98–Aug-03	Dr Graham Bonnett	\$6,233
JCU023	Investigation, design and preliminary testing of juice separation technology	Jul-00–Dec-03	Assoc Prof Jeff Loughran	\$70,758
SRI068	Improvements to batch high grade fuggalling performance	Jul-97–Oct-03	Dr Ross Broadfoot	\$5,777
SRI097	Costs and benefits of the CBA boiling scheme for high pol sugar production	Jul-99–Sep-03	Dr Ross Broadfoot	\$5,239
SRI107	Improved transfer to mills of technology developed by the Sugar Research Institute	Jul-00–May-04	Dr Terry Dixon	\$44,352
SRI111	Improved materials for reducing factory maintenance costs	Jul-01–Jun-04	Dr Gaye Davy	\$30,980

Project	Title	Duration	Contact	Funds 2003–04
SRI112	Modified long life roll shell surface for eliminating roll arcing and extending roll shell life	Jul-01–Jun-04	Dr Gaye Davy	\$17,395
SRI118	Measuring the benefits of the SRI integrated base cutter and crop divider height control system, and the Copersucar-type floating base cutter system	Jul-02–Jul-03	Dr Matthew Schembri	\$21,182
SRI119	Clarification of A molasses	Jul-02–Jul-03	Mr Rod Steindl	\$20,944

Strategy C3 Diversify the income stream from the products of sugarcane, primarily by broadening the product base

Continuing Projects

SRI121	Natural products and value adding — Phase II	Jul-02–May-04	Dr Les Edye	\$50,000
Other Program C Projects				\$316,553
Total for Program C				\$1,329,706

Program D Industry Capacity

Strategy D1 Enhance people's capacity to learn and change

Continuing Projects

AFF001	Corporate governance for rural women	Jul-02–May-04	Ms Tracy Henderson	\$10,000
DHC001	Innovating and Developing Human Capacity in Rural Industries (joint RDC program)	Jul-01–Jul-06	Ms Tracy Henderson	\$20,000

New Projects

ARP011	Australian Rural Leadership Program — Course 11	Jan-04–Jan-06	Mr John Quantrill	\$44,500
CSR029	Building capacity to lead and implement regional transformation in the sugar industry	Jul-03–Oct-04	Mr Ian Sampson	\$150,000
HYF001	Travel to the southern Australian sugar industry	Mar-04–Apr-04	Mr Brian Tabone	\$11,000
SRI130	Technology transfer — more skilled factory staff via troubleshooting/help manuals and access to SRI modelling software	Jul-03–May-06	Mr Peter Everitt	\$42,131

Project	Title	Duration	Contact	Funds 2003–04
<i>Strategy D2 Foster targeted continuing education, attraction and retention of human capital throughout the industry value chain</i>				
<i>Continuing Projects</i>				
AFF002	Science and Innovation Awards for Young People	Mar-03–Sep-04	Ms Tracy Henderson	\$0
BSS254	Support for core competence in strategic activities conducted by BSES (System D)	Jul-01–Jun-04	Mr Eoin Wallis	\$231,430
NFF001	Travel to World Congress of Young Farmers 2003	May-03–Sep-03	Ms Tracy Henderson	\$0
RDA001	Innovator and R&D Awards	Jul-03–May-04	Dr Russell Muchow	\$12,000
STA001	Student Travel Awards	Jul-03–May-04	Ms Tracy Henderson	\$3,000
STU031	H Fengdou — Improved selection systems and data analysis for sugarcane breeding	Jan-02–Apr-05	Prof Kaye Basford	\$24,000
STU032	K Nutt — Proteinase inhibitors from canegrubs	Jul-00–Oct-03	Dr Peter Allsopp	\$0
STU033	D Ward — Strategic baiting protocols for rodents in sugarcane	Feb-00–Jan-04	Dr John Wilson	\$2,417
STU037	C Brosnan — Expression modulating sequences for preventing transgene silencing in genetically-engineered sugarcane	Apr-01–Jul-04	Dr Bernie Carroll	\$21,750
STU038	N Flint — Sublethal and long term effects of poor water quality on freshwater and estuarine	Jan-01–Apr-04	Prof Richard Pearson	\$14,500
STU039	E Meier — The availability of nitrogen in GCTB soils in the wet tropics and its impact on productivity and profitability	Mar-01–Jul-04	Dr Malcolm Wegener	\$4,500
STU041	C Ngo — Molecular analysis of suckering and tillering in sugarcane	Jul-02–Jul-05	Dr Christine Beveridge	\$29,000
STU042	K Ritter — An investigation of the genetic, biochemical and molecular basis of sugar accumulation in sugarcane	Mar-02–Jul-05	Dr Ian Godwin	\$29,000
STU046	A Keir (Hons03) — Enhancing wildlife conservation in sugarcane-growing areas	Feb-03–Jan-04	Prof Richard Pearson	\$0
STU047	S Williams (Hons03) — Expression modulating sequences (EMSs) for enhancing post-transcriptional gene silencing & artificial resistance	Feb-03–Jan-04	Dr Bernie Carroll	\$0

Project	Title	Duration	Contact	Funds 2003–04
STU048	M James — Application of engineering principles and computer modelling skills to harvester	Jan-03–Jan-05	Dr Duncan Campbell	\$29,000
STU049	P Wulf — Self-regulatory codes of practice & their effectiveness in achieving best environmental management practices within NQ primary industries	Mar-03–Jul-06	Prof Geoff McDonald	\$29,000
<i>New Projects</i>				
BSS262	Travel to the 5th ISSCT Entomology Workshop	Jul-03–Jan-04	Dr Peter Samson	\$6,300
BSS263	Travel to the 1st Australian Farming Systems Conference 2003	Sep-03–Dec-03	Mr Richard Kelly	\$4,710
CG003	Assessment of training needs for the Australian sugar industry	Jul-03–May-04	Mr Jim Kirchner	\$50,000
CPI006	Travel to the International Conference on Assimilate Transport and Partitioning	Jul-03–Feb-04	Dr Christopher Grof	\$4,400
STU050	New Honours 2004	Feb-04–Jan-05		\$6,000
STU051	New Honours 2004	Feb-04–Jan-05		\$6,000
STU052	New Postgraduate 2004	Jan-04–Jul-07		\$14,500
STU053	New Postgraduate 2004	Jan-04–Jul-07		\$14,500
WS008	Continuous improvement and innovation workshop	Sep-03–Dec-04	Ms Janice Timms	\$17,773
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	Dr Roslyn Prinsley	\$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>New Projects</i>				
BCA001	Benefit-cost analysis of PIERD and CP2002-funded projects	Sep-03–Feb-04	Dr Russell Muchow	\$100,000
Total for Program D				\$951,411
Grand Total all Programs				\$7,906,133

ATTACHMENT B

ORGANISATIONAL IDENTIFIERS IN PROJECT CODES

Project Codes	Organisation
AFF	Department of Agriculture, Fisheries and Forestry Australia
ARP	Australian Rural Leadership Program
BCA	Benefit Cost Analysis of SRDC Projects
BSS	Bureau of Sugar Experiment Stations
CG	Canegrowers
CLW	CSIRO Land and Water
CPI	CSIRO Plant Industry
CSE	CSIRO Sustainable Ecosystems
CSR	CSR Sugar Ltd
CTA	CSIRO Tropical Agriculture
CVA	Climate Variability in Agriculture
DHC	Rural R&D Corporations Developing Human Capacity Program
DPI	Queensland Department of Primary Industries
HYF	Herbert Young Farmers
ICB	International Consortium for Sugarcane Biotechnology
JCU	James Cook University
LMC	LMC International Ltd
MAS	Mossman Agricultural Services
MSA	Mackay Sugar Cooperative Association
NA	New South Wales Agriculture
NFF	National Farmers Federation
NSC	New South Wales Sugar Milling Cooperative Ltd.
OHS	Rural R&D Corporations Farm Health & Safety Program
RDA	SRDC R&D Awards and Innovator Awards
SAI	South Australian Research and Development Institute
SRI	Sugar Research Institute
STA	Student Travel Awards
STU	SRDC Student Scholarships
UQ	The University of Queensland
WS	Workshops
YDV	Yield Decline Joint Venture

ATTACHMENT C

ABBREVIATIONS AND ACRONYMS

ACFA	Australian Cane Farmers' Association
ACGC	Australian Cane Growers' Council
AFFA	Department of Agriculture, Fisheries & Forestry Australia
AOP	Annual Operational Plan
ASMC	Australian Sugar Milling Council
BSES	Bureau of Sugar Experiment Stations
CAC Act	Commonwealth Authorities and Companies Act 1997
CCS	Commercial Cane Sugar
CP2002	Cross-Program: Accelerated Enhancement of Productivity and Profitability for the Australian Sugar Industry
CRC	Cooperative Research Centre
CSIRO	Commonwealth Scientific and Industrial Research Organisation
PIERD Act	Primary Industries and Energy Research and Development Act 1989
QDPI	Queensland Department of Primary Industries
QSL	Queensland Sugar Limited
R&D	Research and Development
RDC	Research and Development Corporations
SRDC	Sugar Research and Development Corporation
SRI	Sugar Research Institute