SUGAR RESEARCH AND DEVELOPMENT CORPORATION

ANNUAL OPERATIONAL PLAN

2000–2001

Sugar Research and Development Corporation 2000
ISSN 1036-6863

Telephone: (07) 3210 0495
Facsimile: (07) 3210 0506
Email: srdc@srdc.gov.au

Cover photo: The selling floor of the New York Coffee Sugar and Cocoa Exchange. (Photos courtesy of Queensland Sugar Limited)

Cover and text design by Melinda Rene
Typeset by Sun Photoset Pty. Ltd., Brisbane
Printed in Australia by Watson Ferguson & Co., Brisbane

CONTENTS

BACKGROUND

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 1999–2004.

SRDC Board of Directors 2000/01

Chairperson	Mr C P Hildebrand
Deputy Chairperson	Mr J C Baird
Government Director	Mr I R Cottingham
Directors	Dr P S Brennan
	Mr I L Fraser
	Professor R E Jones
	Mr A Barfield
	Mr D R McGuffog
Executive Director	Mr E S Wallis

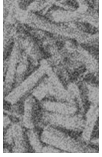
Contact Addresses:

SRDC
PO Box 12050
Brisbane Elizabeth Street
QLD 4002

Phone:	(07) 3210 0495
Fax:	(07) 3210 0506
Email:	srdc@srdc.gov.au
Web:	http://www.srdc.gov.au

Office Locations:

Brisbane:	Level 16, 141 Queen Street, Brisbane
Innisfail:	88 Rankin Street, Innisfail



PREFACE

This Annual Operational Plan is the first to be submitted based on the SRDC R&D Plan 1999–2004.

SRDC worked with the sugar industry organisations, research providers and government in developing the revised R&D Plan 1999–2004 which was approved by the Minister for Agriculture, Fisheries and Forestry in November 1999.

The revised Plan retains the eight program structure of the previous Plan. The format was enhanced through the adoption of an outcome/output framework to facilitate performance reporting required by the Commonwealth Authorities and Companies Act 1997.

In addition, the outcome/output framework was applied at a more strategic level to enhance SRDC's accountability. The new R&D Plan more clearly aligns corporate objectives, planned inputs, outputs, outcomes and strategies directly with statutory objectives and provides SRDC with a more useful framework in which to assess its performance and statutory reporting.

A copy of the overview of the SRDC R&D Plan 1999–2004 is attached to this Preface.

SUGAR RESEARCH AND DEVELOPMENT CORPORATION

RESEARCH AND DEVELOPMENT PLAN 1999-2004

OVERVIEW

PURPOSE

OBJECTS OF THE PIERD ACT

To make provision for the funding and administration of research and development relating to primary industries with a view to:

- Increasing the economic, environmental or social benefits to members of the primary industries and to the community in general by improving the production, processing, storage, transport or marketing of the products of primary industries;
- Achieving the sustainable use and sustainable management of natural resources;
- Making more effective use of the resources and skills available in the community in general, and in the scientific community in particular; and
- Improving accountability for expenditure upon R&D activities in relation to primary industries.

THE SRDC MISSION

SRDC fosters an internationally competitive and sustainable Australian sugar industry through directed funding to meet the research and development needs of the sugar industry.

SRDC OBJECTIVES

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

TARGET OUTCOMES

PRINCIPAL OUTCOME

Enhanced international competitiveness, profitability and sustainability of the Australian Sugar Industry

KEY OUTCOMES

By 2004 it is expected that R&D will have resulted in:

- Improved productivity and cost efficiency of sugarcane production and sugar manufacture
- Enhanced marketability of sugar
- Maintenance or enhancement of the land and water resources on which the sugar industry is based
- Minimised impact of the sugar industry on other ecosystems

And SRDC will have achieved:

- Enhanced communication between the sugar industry, research providers and the community
- An increased R&D base and the effective and efficient application of SRDC's resources

KEY PERFORMANCE INDICATORS

- Economic returns from SRDC investments in excess of a benefit:cost ratio of 5:1, as well as non-monetary and public good benefits for the community from strategic and environmental research
- Alignment of SRDC's priorities and plans with those of industry and the Commonwealth Government, assessed by approval of SRDC actions by the Minister and acceptance by the industry
- Accountability to SRDC of its research providers measured by unapproved carryovers at end of financial year (milestones not submitted or not accepted) equivalent to less than 5% of budget
- Ratio of administration to total costs less than the RDC average cost
- SRDC statutory documents submitted on time and meeting all requirements.

OPERATING INPUTS AND OUTPUTS

KEY STRATEGIES

- To identify and prioritise the R&D needs of the industry and community
- To invest R&D funds consistent with the strategies of, and the allocation of resources among, Programs of the R&D Plan
- To manage the investment in R&D effectively
- To assess and report on progress in R&D programs
- To promote the adoption of R&D outputs to produce industry and community benefits.

KEY INPUTS

- R&D funds from industry levies and matching government contribution
- Industry and community advice
- SRDC Board, personnel, and management processes.

R&D PROGRAMS

- 1. Plant Improvement
- 2. Crop Management
- 3. Crop Protection
- 4. Cane Harvest and Transport
- 5. Sugar Manufacture
- 6. Environmental and Natural Resource Management
- 7. Enhanced Marketability
- 8. Whole-of-Industry Competitiveness.

MULTI-PROGRAM ACTIVITIES

MP1 Effective and efficient use of R&D resources
MP2 Management of SRDC
MP3 CP2002 Accelerated enhancement of productivity and profitability.

PRINCIPAL OUTPUT

- Management of R&D within eight programs and three multi-program activities.

KEY OUTPUTS

- Improved varieties and crop management and harvesting systems
- Improved sugar manufacturing equipment and processes
- Reduced off-site impacts of the sugar industry
- Enhanced whole-of-industry profitability decision support tools and other communication activities
- R&D Plan, Annual Operational Plan and Annual Report completed according to statutory requirements and industry needs
- Best practice R&D and financial management systems.

1 INTRODUCTION

The Australian sugar industry produces raw and refined sugar from sugarcane. While it produces only 4% of the world sugar supply, it exports approximately 12% of the sugar traded worldwide and its net income from sugar sales in 1999/00 was approximately $1.4 billion.

The Sugar Research and Development Corporation (SRDC) funds research and development (R&D) projects aimed at producing outcomes that benefit the Australian sugar industry and the Australian community through plant improvement, improved crop management and protection systems, improved harvesting and transport, enhanced efficiency of sugar manufacture, enhanced marketability, improved environmental and natural resource management and improved industry competitiveness.

SRDC is not structured to take a direct role in research. Rather, it is a body within which a strategic view of the needs and opportunities for R&D in the sugar industry can be focussed, and through which appropriate research and development activities can be encouraged and funded.

SRDC is a statutory authority with a mission to foster an internationally competitive and sustainable Australian sugar industry through directed funding to meet the research and development needs of the sugar industry.

In July 1999, SRDC advertised nationally for preliminary project proposals for projects to commence in 2000/01. One hundred and nineteen preliminary applications were received and considered by SRDC according to the following criteria:

- The priority of the issue as identified in the SRDC R&D Plan 1999–2004
- The priority of the project as it addressed the issue, and
- Appropriateness of the focus, objectives, methods and proposed outcomes of the project.

In November 1999 the Corporation invited the proponents of 30 applications to submit full proposals for consideration for inclusion in the 2000/01 Annual Operational Plan. A copy of the draft, then the final approved R&D Plan 1999–2004 was provided for guidance of these proponents. The number of new proposals invited was 48% less than the previous year due to a significant reduction in funds available following a substantial decline in the gross value of sugarcane production. The number of full proposals invited was 25% of preliminary proposals received, compared with 30% and 37% in the previous two years.

Twenty-nine full proposals plus ten applications for travel were considered by the SRDC Board at its budget meeting in March 2000. A revised ranking procedure was implemented to select projects for funding at this final stage. The revised procedure incorporated rating each project for its potential net benefits, the likelihood of the project meeting its objectives and the expected extent and speed of adoption of the project outputs. A separate benefit/cost assessment was made by an independent expert and both assessments were considered by the Board before project selection. Following discussions with the relevant research institutions, the final portfolio of projects was consolidated by SRDC for submission to the Minister for Agriculture, Fisheries and Forestry.

2 CORPORATE GOVERNANCE

2.1 Enabling Legislation and Legislative Objectives

SRDC was established under the *Primary Industries and Energy Research and Development Act 1989* on 1 October 1990. As a Commonwealth Statutory Authority it is also subject to the *Commonwealth Authorities and Companies Act 1997*.

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;
- To achieve sustainable use and sustainable management of the natural resource base of the sugar industry;
- To apply industry, scientific and community resources more effectively to R&D in the sugar industry; and
- To 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 Propriety Limited.

SRDC is accountable to both the Commonwealth Government and these representative organisations. SRDC meets formally with the representative organisations at least twice each year to discuss SRDC activities and statutory reporting, levy arrangements, R&D priorities and any other matters of mutual interest.

2.4 Responsible Minister — Ministerial power of direction

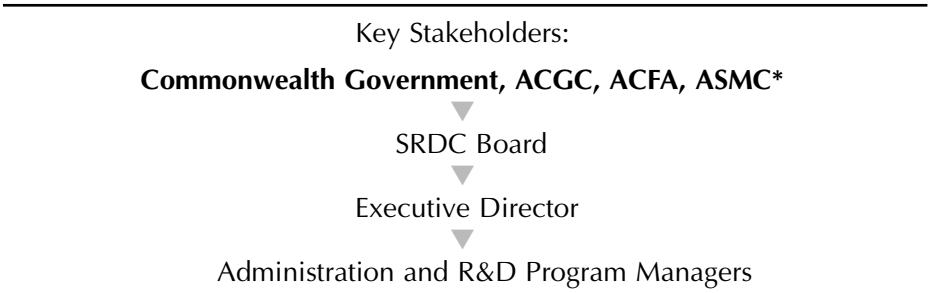
SRDC is responsible to the Minister for Agriculture, Fisheries and Forestry. The Minister:

- 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 member of SRDC

In October 1998, responsibility for rural research and development was delegated to Senator Judith Troeth, Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry.

2.5 Management Framework

2.5.1 Corporate structure



* ACGC Australian Cane Growers' Council
ACFA Australian Cane Farmers' Association
ASMC Australian Sugar Milling Council

2.5.2 Structures, processes, controls

Directors' corporate governance of SRDC includes development of its strategic direction and desired outcomes, establishing performance indicators, policies and procedures for the operation of the Corporation, and ensuring the Corporation acts responsibly and legally within the boundaries of the PIERD Act 1989, under which it is established. 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. This includes a review of progress towards achieving the desired outcomes and outputs in each of its eight R&D Programs and consideration of 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 mechanisms.

3 OPERATING ENVIRONMENT

3.1 R&D Environment

The international R&D infrastructure for sugar is not as well developed as it is for the major food grain crops such as wheat and rice. However, there is considerable collaboration among the sugar research organisations in the major producing countries. There is also a strong International Society for Sugar Cane Technologists (ISSCT), with specialist working groups. Interaction in the R&D sector of the world sugar industry includes germplasm exchange, research collaboration in biotechnology, and information exchange in pre-competitive aspects of growing and milling technologies. In many commercially sensitive areas, however, international competition has limited free exchange of information.

In Australia, SRDC seeks to establish partnerships in research and development with the industry and the research community, focussed on addressing the strategic needs and opportunities of the industry. While the competitive funding and partnership models are expected to be favoured in most funding situations, SRDC acknowledges that commissioned research may be necessary to fill particular gaps in a program.

Funding of SRDC is by a levy, currently $0.15¢ per tonne of sugarcane milled, shared equally between growers and millers. Expenditure of levy income is matched dollar for dollar by the Commonwealth Government up to 0.5% of the gross value of production of cane. In July 1998, the then Minister for Primary Industries and Energy announced that an additional $13.45 million would be made available for sugar industry R&D over the four years to 30 June 2002. These additional funds are managed by SRDC across SRDC programs as the cross-program activity, "CP2002 — Accelerated enhancement of productivity and profitability for the Australian sugar industry", and are henceforth termed "CP2002".

Following a period of substantial increase in R&D funding for the Australian sugar industry SRDC PIERD funding declined from $14.16 million in 1998/99, to $13.63 million in 1999/2000 and will fall to an estimated $11.76 million in 2000/01. The decline will be partially offset by the special allocation for R&D in CP2002, but the SRDC total budget will fall from $17.98 million in 1999/00 to $16.81 million in 2000/01.

The decline in PIERD funding is due to a fall of 23% in the world price of sugar, from 1998/99 to 1999/00, resulting in a reduction in the gross value of production despite an increase in sugar production from 5.48 million tonnes in 1999/00 to an expected 5.63 million tonnes in 2000/01. (ABARE forecast at Outlook 2000). The world sugar price is expected to increase marginally in 2000/01 before recovering to 1998/99 prices by 2003/04.

The Australian sugar industry and its R&D community face a difficult period over the next two to three years. The research base underpinning the industry remains strong with 37 research providers in 2000/01 compared with 20 six years ago. The resources

available for R&D, including those directed to specific problems in CP2002, maintain the focus on issues that will improve cost effectiveness in the short term and contribute to longer term sustainability.

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 community.

3.3 Stakeholder R&D Priorities

During 1999, SRDC revised its R&D Plan. In considering the needs and opportunities for R&D, it took into account:

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

3.3.1 Industry, R&D Provider and Agribusiness Priorities

Throughout 1999, the industry, R&D providers and other stakeholders cooperated to revise the industry priorities through a series of regional seminars. The top ten priorities to emerge from these seminars were:

1. Sugar/cane quality
2. Efficient use of capital
3. Varieties for high/early/late CCS
4. Harvester performance, design and measurement issues
5. Pest/disease/weed control, using IPM, quarantine issues
6. High Density Planting and efficient planting systems
7. Adoption and extension
8. New brands/product deversification
9. Disposal and re-use of mill mud/ash
10. Water use efficiency

These priorities and whole-of-industry issues were taken into account in developing the desired outcomes for each of the eight programs from the SRDC R&D Plan 1995–2000. These programs were adopted as the framework for the new plan.

In August 1999, SRDC conducted three workshops with its key stakeholders, including industry, government and R&D providers to set indicative proportions of funding in each of the eight programs. This process was designed & facilitated via an external expert. It used the SRDC benefit model across the sugar industry production chain, recently developed and revised. The model provided estimates of where maximum benefits to the industry and community would accrue from R&D investment. The result of these

workshops was a greater emphasis on whole-of-industry, sugar manufacturing and marketing issues, with indicative funding proportions reflecting this change in priority.

3.3.2 Commonwealth Government Priorities

In December 1999 the Minister for Agriculture, Fisheries and Forestry and his portfolio colleagues reviewed the Government's priorities for rural research and development and issued the following updated priorities:

- Sustainable management and use of our soil, water, air, vegetation and fauna resources integrated into farming and land use systems
- A whole of industry approach to production, processing and marketing to ensure the chain works to its best advantage
- Development of biotechnology, along with sensitive handling to accommodate consumers' concerns
- Trade and market access negotiations
- Maintenance and enhancement of our clean green image
- Addressing food safety concerns of consumers
- Cultivating creativity and innovation among our human resources

In essence the Commonwealth Government aims to promote and develop competitive, profitable and sustainable Australian agriculture, food, fishing and forest industries which promote economic development and job creation, particularly in rural and regional Australia. The investment in R&D is made with the expectation that the returns would benefit not only the industries directly, but also the wider community. To achieve this the areas of investment must be broadly focussed across economic and trade activity, must deliver socially desirable outcomes, and must preserve our natural resource base for future generations.

3.4 Ecologically Sustainable Development

SRDC uses the definition of sustainable production systems developed by the Australian Standing Committee on Agriculture in 1991. This has three components:

- Increased financial viability (this may involve additional costs at some stage);
- Maintenance of the natural resource base;
- Minimum impact of production on other ecosystems.

In addition, SRDC now places increased emphasis on the social impacts of environmental management, consistent with the 1999 report of the Productivity Commission on the Implementation of ESD by Commonwealth Departments and Agencies.

SRDC manages its R&D activities to address ESD in two broad ways:

- The impact of sugar industry production and processing activity on other ecosystems (including social impacts) through R&D in Program 6;
- The development of industry practices which maintain and/or enhance the economic viability of sugar production and processing and the industry's natural resource base through R&D in Programs 1–5.

This integrated approach aligns with the Government's ESD strategy. SRDC strategies to address this complex area will take into account the following related activities:

- The Code of Practice for Sustainable Cane Growing in Queensland;
- The operations of GBRMPA, AIMS, the CRC for Sustainable Sugar Production and the CRC for the Great Barrier Reef World Heritage Area;
- The R&D conducted on natural resource management by state agencies;
- The legislative framework of the Commonwealth and State Governments.

All these activities will underpin the sugar industry's stewardship of its resource base. R&D is a vital component in achieving these objectives.

3.5 Public Good R&D

Benefits to the broader community, including spillover benefits beyond the sugar industry, will be a major outcome from more than 65% of the projects included in this AOP.

Projects delivering benefits to the broader community include 19 projects in Program 6 which aim to minimise the impact of the sugar industry on other ecosystems. A further 66 projects (42% of the portfolio) are aimed at preventing or ameliorating degradation of the natural resource base within sugar production and manufacturing sectors, or providing benefits to the wider community through contributions to training and communication. These include projects to develop varieties resistant to pests and diseases, to develop integrated pest management systems and reduce pesticide use, to increase the adoption of green cane harvest and trash blanketing, to make more efficient use of the water resource, to develop reduced tillage systems, to ameliorate soil acidity and sodicity, to improve catchment drainage and to achieve the adoption of sustainable nutrient management strategies.

Eighteen projects (11% of the portfolio) in the areas of plant improvement, crop management, crop protection, cane harvest and transport and sugar manufacture will provide spillover benefits beyond the Australian sugar industry. These are strategic research projects in areas of biotechnology, sugarcane physiology, and various aspects of modelling milling operations.

4

MPA3 — CP2002 — ACCELERATED ENHANCEMENT OF PRODUCTIVITY AND PROFITABILITY FOR THE AUSTRALIAN SUGAR INDUSTRY

CP2002 is one of three multi-program activities outlined in the SRDC R&D Plan 1999–2004 and was established to manage the special allocation of $13.45 million announced by the then Minister in August 1998. These funds are to be used for sugar industry R&D over a four year period from 1998 to 2002 to address problems of sugar content, pest control and associated productivity issues. They supplement the Commonwealth Government current contribution to sugar R&D under the PIERD Act and are managed by SRDC consistent with its obligations to the Australian sugar industry and the Commonwealth Government.

CP2002 is managed as a "cross-program" activity in all of SRDC's programs outlined in the R&D Plan except Programs 6 and 7 (Environmental and Natural Resource Management and Enhanced Marketability). R&D conducted in CP2002 will have a longer term impact in these programs through enhanced viability and will significantly contribute to SRDC's corporate outcome.

4.1 Desired Outcomes

- CP2002 resources allocated (following industry participation in identifying, implementing and monitoring of R&D) to increase the profitability of the sugar industry;
- Increased level of collaboration among research providers and sugar industry participants;
- Enhanced adoption of "best management practices" by industry to improve the viability of the sugar industry, with emphasis on improving sugar content and pest control;
- Identified means of increasing sugar mill throughput without significant capital investment;
- Increased profitability over the base line established at the start of the program, in priority issues and regions.

4.2 Outputs for 2000/01

- The CP2002 Program will be reviewed with involvement from industry stakeholders, to evaluate progress of R&D on priority issues.
- Draft guidelines for Best Management Practices in the areas of harvesting, pest control and drainage, developed and evaluated with the industry.
- Identified the conditions under which sugar content can be increased following the application of chemical ripeners.
- Determined the feasibility of controlling the greyback canegrub pest in north Queensland by applying pesticides into ratoon crops.

- Strategic plans developed for two north Queensland sugar mill areas to improve long-term viability of the Industry in this region.
- Identified the costs and benefits of supplying clean cane for increased sugar content and increasing milling capacity without significant capital investment.

4.3 Strategies by which to Achieve Outcomes

Strategy CP2002.1 *To create, manage and report on an additional program to improve the viability of the sugar industry.*

The Program Manager appointed in October 1998 to manage CP2002 will continue duties in 2000/01. In addition, support for this multi program activity will continue to be provided by an Advisory Committee at the program level and by two Consultative Committees on an issue or regional basis.

Strategy CP2002.2 *To adopt a participatory approach to the identification of needs for and implementation of R&D to improve sugar content, pest control and grower profitability.*

Sugar industry representatives and research providers will again be involved in implementing and monitoring the additional R&D activities in 2000/01. These include grower managed on-farm R&D.

Strategy CP2002.3 *To fund additional R&D projects directed at specific long-term outcomes, strategies and outputs in the SRDC R&D Plan.*

A total of $5.05 million is recommended for project funding and administration in CP2002 in 2000/01. Details of the projects are listed within Programs 1–5 and 8 in Attachment A, while funds allocated within programs are detailed in Table 5 on page 15.

Strategy CP2002.4 *To commission relevant R&D activity to identify gaps in current R&D, collate existing knowledge on "best management practices", and prepare and distribute extension material on best practices.*

At least two new projects will be commissioned in CP2002 in 2000/01. They, together with projects commissioned in 1999/00 and continuing in 2000/01, are included in the projects listed within Programs 1–5 and 8 in Attachment A.

Strategy CP2002.5 *To provide infrastructure (salaries, operating, travel and capital) support to build capacity to address CP2002 issues, and to enable enhanced R&D capacity beyond June 2002.*

All infrastructure provided within CP2002 was funded in 1998/99 and 1999/00 in Program 1 under Output 1.

5 OUTCOMES AND OUTPUTS

In 1999 SRDC revised its Corporate R&D Plan which was approved by the Minister for Agriculture, Fisheries and Forestry in November 1999. The Plan identified an overall SRDC outcome and outputs by which to achieve that outcome.

5.1 Relationship between SRDC Outcomes and Outputs

The SRDC R&D Plan 1999–2004 identified key outputs by which to achieve its principal or overall outcome. The four major outputs and outcome in Figure 1 are consistent with those identified in the R&D Plan. Figure 1 shows the contribution of the four outputs to SRDC's overall outcome in 2000/01.

5.2 SRDC Outcome

SRDC's outcome is:
Enhanced international competitiveness, profitability and sustainability of the Australian sugar industry.

This outcome is consistent with AFFA's stated outcome of increasing the profitability, competitiveness and sustainability of Australian agricultural, food, fisheries and forestry industries.

Sugar industry and Commonwealth Government priorities include sustainable natural resource management, adoption of a whole-of-industry approach, improved sugar quality and increased access to markets, efficient use of capital, improved human resource management and more profitable crop production and sugar manufacturing systems.

SRDC funds research and development aimed at producing its outcome to benefit the Australian sugar industry and the Australian community through plant improvement, improved crop management and protection systems, improved harvesting and transport, enhanced efficiency of sugar manufacture, enhanced marketability, improved environmental and natural resource management and improved whole of industry competitiveness.

Figure 1 — Relationship between Outcomes and Outputs in 2000/01

SUGAR RESEARCH AND DEVELOPMENT CORPORATION
Chairperson: Mr Clive Hildebrand
Executive Director: Mr Eoin Wallis

OUTCOME:
Enhanced international competitiveness, profitability and sustainability of the Australian sugar industry.

Total Price of Outputs: $16.81 m.

OUTPUT 1: *Management of R&D that results in improved varieties and crop management and harvesting systems*	**OUTPUT 2:** *Management of R&D that results in improved sugar manufacturing equipment and processes*	**OUTPUT 3:** *Management of R&D that results in reduced off-site impacts of the sugar industry*	**OUTPUT 4:** *Management of R&D that results in enhanced whole of industry profitability, decision support tools and other communication activities*
Total Price: $10.71m	**Total Price: $2.83m**	**Total Price: $1.62m**	**Total Price: $1.65m**

5.3 Outcome — Resourcing

The total revenue for SRDC including industry levies, Commonwealth matching contribution and CP2002 for 2000/01 for the SRDC outcome is shown in Table 1.

Table 1 SRDC Revenue in 2000/01 ($'000)

Outcomes Price of Outputs

	Monies from Industry levies	Commonwealth contribution	Special Commonwealth Allocation CP2002	Revenue from other sources	Total Revenue
SRDC Outcome	6270	4502	5050	330	16 152

Table 2 shows how the 2000/01 budget translates to total resourcing for the SRDC outcome, including the price of each output.

Table 2 Total Resources for SRDC's Outcome

Output	Estimated Actual 1999–2000 ($'000)	Estimated Expenditure 2000–2001 ($'000)
Output 1 — Management of R&D that results in improved varieties and crop management and harvesting systems	12 000	10 710
Output 2 — Management of R&D that results in improved sugar manufacturing equipment and processes	2869	2830
Output 3 — Management of R&D that results in reduced off-site impacts of the sugar industry	2010	1620
Output 4 — Management of R&D that results in enhanced whole-of-industry profitability, decision support tools and other communication activities	1100	1650
Total Resourcing for Outcome	17 979	16 810
Average Staffing level (full-time equivalents)	*7*	*7*

The distribution of SRDC funds among its major research providers is presented in Table 3 while the allocation of funds among all SRDC activities is presented in Table 4.

Table 3 Proposed SRDC Expenditure by Research Organisation and Other Activities 2000/01 (excludes contingency)

Organisation	Expenditure	
	$m	%
BSES	7.03	43
SRI	1.37	8
CSIRO	2.13	13
UQ	.32	2
JCU	.36	2
DNR	.19	1
Other Providers	2.34	14
Other Activities	2.65	16
TOTAL	**16.39**	**100**

Table 4 Proposed SRDC Total Expenditure 2000/01 (excludes contingency)

Activity	Expenditure	
	$m	%
Continuing Projects	10.29	63
New Projects	0.74	4
Capability Building	0.49	3
Scholarships	0.30	2
Commissioned Research	0.37	2
Infrastructure	2.76	17
Research Administration & Operation of SRDC	1.44	9
TOTAL	**16.39**	**100**

The SRDC budget applied to the R&D Programs in which the outputs are produced is given in Table 5.

Table 5 2000/01 SRDC BUDGET ($m)
(Estimated Crop Size 41.7 mt, Levy Rate $0.15)

	Program								
	1	2	3	4	5	6	7	8	TOTAL
INCOME									
Industry Contribution									**6.27**
Commonwealth Contribution (Total)									**9.55**
PIERD Matching									4.50
CP2002									5.05
Interest/Other									**0.33**
TOTAL INCOME									**16.15**
EXPENDITURE									
PIERD Program									
Continuing Projects	1.41	1.21	0.50	0.29	0.57	1.09	0.42	0.27	5.76
New Projects	0.21	0.03	0.04	0.00	0.19	0.06	0.05	0.14	0.72
Capability Building	0	0.23	0.17	0.02	0	0.05	0	0.02	0.49
Scholarship/ Augmentation Grants	0.13	0.05	0.04	0.06	0	0.00	0	0.02	0.30
Research Administration	0.04	0.04	0.03	0.04	0.03	0.03	0.02	0.01	0.24
Operation of SRDC	0.17	0.12	0.08	0.09	0.11	0.10	0.08	0.11	0.86
Infrastructure	0.44	0.31	0.20	0.31	0.45	0.26	0.34	0.45	2.76
Commissioned Research	0.03	0.00	0.05	0.20	0	0	0	0.09	0.37
Contingency	0.06	0.04	0.02	0.02	0.03	0.03	0.03	0.03	0.26
Total PIERD	2.49	2.03	1.13	1.03	1.38	1.62	0.94	1.14	11.76
CP2002 Program									
Projects	0.42	1.58	0.85	0.80	0.44	0	0	0.46	4.55
Research Administration & operation of SRDC	0.08	0.07	0.05	0.05	0.05	0	0	0.04	0.34
Contingency	0.05	0.04	0.03	0.01	0.02	0	0	0.01	0.16
Total CP2002	0.55	1.69	0.93	0.86	0.51	0	0	0.51	5.05
TOTAL EXPENDITURE	3.03	3.88	2.03	1.77	1.89	1.62	0.94	1.65	16.81

5.4 Contribution of Outputs to Outcome

The outputs which SRDC aims to produce in order to achieve its outcome are listed in Table 2. They are produced through R&D conducted within the eight programs of the SRDC R&D Plan 1999–2004.

In addition, development of the human resource base for sugar industry R&D is undertaken in each of the R&D programs producing the above outputs.

SRDC's outputs of improved crop production and manufacturing systems and enhanced whole-of-industry profitability reflect the priorities of government and industry for a more profitable and sustainable sugar industry. In addition, reduced off-site impacts of the sugar industry reflect the priority to minimise industry impact on other ecosystems, including social impacts.

SRDC identifies and prioritises R&D needs of the sugar industry and community, invests R&D funds consistent with those needs, monitors R&D progress, promotes the adoption of R&D outputs and evaluates the resultant industry and community benefits.

5.5 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 6.

Table 6 Effectiveness Indicators for SRDC Outcome

Effectiveness Indicator	Comment
• *Economic returns from SRDC investments in excess of a benefit:cost ratio of 5:1, as well as non-monetary and public good benefits for the community from strategic and environmental research*	(a) cost/benefit analyses of completed R&D and its resultant benefits (b) assessment of program outputs as measures of desired program outcomes for plant improvement, improvement of crop production and manufacturing systems, whole of industry competitiveness and enhanced management of natural resources.
• *Alignment of SRDC's priorities and plans with those of industry and the Commonwealth Government, assessed by approval of SRDC actions by the Minister and acceptance by the industry*	This assesses whether SRDC's outputs are aligned with industry and government priorities, are derived from quality R&D projects and are consistent with expected industry and community benefits.

Performance information for SRDC's four outputs in 2000/01 is presented in Table 7.

Table 7 Performance Indicators for SRDC's Outputs

Output	Performance Indicators
Output 1 *Management of R&D that results in improved varieties and crop management and harvesting systems*	*Quality*: Accountability to SRDC of its research providers measured by unapproved carryovers at end of financial year (milestones not submitted or accepted) equivalent to less than 5% of budget. Accountability is achieved through monitoring project milestones, financial reporting requirements and project and sub-program reviews to ensure delivery of output *Quantity*: 7 new and 96 continuing contracts (projects) *Price*: Average of $102,700 per project
Output 2 *Management of R&D that results in improved sugar manufacturing equipment and processes*	*Quality*: Accountability to SRDC of its research providers measured by unapproved carryovers at end of financial year (milestones not submitted or accepted) equivalent to less than 5% of budget. Accountability is achieved through monitoring project milestones, financial reporting requirements and project and sub-program reviews to ensure delivery of output *Quantity*: 5 new and 30 continuing contracts (projects) *Price*: Average of $79,140 per project
Output 3 *Management of R&D that results in reduced off-site impacts of the sugar industry*	*Quality*: Accountability to SRDC of its research providers measured by unapproved carryovers at end of financial year (milestones not submitted or accepted) equivalent to less than 5% of budget. Accountability is achieved through monitoring project milestones, financial reporting requirements and project and sub-program reviews to ensure delivery of output

Output	Performance Indicators
	Quantity: 2 new and 20 continuing contracts (projects) *Price*: Average of $72,270 per project
Output 4 *Management of R&D that results in enhanced whole-of-industry profitability, decision support tools and other communication activities*	*Quality*: Accountability to SRDC of its research providers measured by unapproved carryovers at end of financial year (milestones not submitted or accepted) equivalent to less than 5% of budget. Accountability is achieved through monitoring project milestones, financial reporting requirements and project and sub-program reviews to ensure delivery of output *Quantity*: 4 new and 11 continuing contracts (projects) *Price*: Average of $108,000 per project

6

EXTENT TO WHICH THE AOP GIVES EFFECT TO THE R&D PLAN

6.1 Allocation of Resources Across Programs

As indicated in its R&D Plan 1999–2004, SRDC aims to achieve its outcome through applying inputs of R&D funds, industry and community advice and SRDC Board processes, personnel and management systems to eight R&D programs and three multi-program activities. These activities produce the outputs required in order to deliver the outcome or benefits to the industry and community.

SRDC involved its key industry government and R&D providers in setting indicative proportions for the allocation of resources across the programs of its R&D Plan. The indicative proportions are substantially different from those of the previous R&D Plan and are presented in Table 8 together with the actual proportions proposed for PIERD funding in 2000/01 and the outputs to which the programs contribute.

Table 8 Indicative and Actual Allocations of Funds to the Eight R&D Programs

Output *	Program	Previous indicative proportion	New indicative proportion	Actual proportion in 2000/01
1.	1. Plant Improvement	21	20	21
see p 21–24	2. Crop Management	16	14	17
	3. Crop Protection	11	9	9
	4. Cane Harvest and Transport	15	9	9
2.	5. Sugar Manufacture	11	13	12
see p 25–26	7. Enhanced Marketability	12	12	14
3.				
see p 27–28	6. Environmental & Natural Resource Management	8	10	8
4.				
see p 28–29	8. Whole of Industry Competitiveness	6	13	10

* The output numbers refer to those in Table 2 on page 13 and Table 7 on pages 17–18.

The new indicative proportions represent a shift in resources from the production sector to the milling, marketing and whole-of-industry sectors. The actual proportions for 2000/01 have shifted significantly towards those of the new plan, although there are still some programs where further change is required. The reallocation of resources was less than desired in 2000/01 because of the downturn in funds available. This was reflected in a 58% reduction in funding for new projects where most of the reallocation would occur. A substantial amount of funding for infrastructure however, has been reallocated from the production to the milling sector after discussion with SRDC's Representative Organisations. This change is in line with industry priorities.

6.2 Allocation of Resources within Programs

The SRDC R&D Plan 1999–2004 outlines strategies to be followed within each of its R&D Programs in order to produce the outputs required to achieve its desired outcome.

The proposed allocations to projects in 2000/01 address all strategies in Programs 1, 2, 3, 5, 6 and 8. In Program 4, no projects are currently funded in the strategy to improve the efficiency of the harvest/transport system. However, a major project in Program 8 is addressing issues of harvest scheduling within a whole-of-industry context and early indications are that major cost savings are possible through changes in this area.

Two of the strategies in Program 7 are not yet addressed. They relate to improvements in sugar transport, storage and distribution and to increasing the demand for sugar products. In the latter case, a project has just been completed in the previous Program 8 dealing with customer perceptions of sugar products.

Sugar marketing and marketability is an area where SRDC and its key stakeholders identified the need for increased resource input. While it was not possible to fund projects in the area of sugar transport in 2000/01, SRDC will be seeking projects in this area in the future.

6.3 Conclusion

The proposed SRDC R&D program for 2000/01 applies resources across its R&D program areas substantially in agreement with the indicative proportions in its R&D Plan 1999–2004. In addition, resources are applied within programs within almost all the strategies identified to produce the outputs required to achieve its overall and program outcomes. In those areas where gaps exist, resources are being reallocated in order to fund appropriate R&D projects in line with industry and government priorities.

7 OUTPUTS EXPECTED IN 2000/01

7.1 Key Strategies

The key strategies stated in the SRDC R&D Plan 1999–2004 to produce SRDC's outputs are:

- To invest R&D funds consistent with the strategies of, and the allocation of resources among, Programs of the R&D Plan; and
- To manage the investment in R&D effectively.

7.2 Output 1 Management of R&D that results in improved varieties and crop management and harvesting systems

R&D funds to produce Output 1 are applied in the following programs:

Program 1	Plant Improvement
Program 2	Crop Management
Program 3	Crop Protection
Program 4	Cane Harvest and Transport

Desired outcomes for each program are stated later in this section, as well as the outputs to be produced in 2000/01. The projects to be funded within each of the program strategies are listed in Attachment A.

Projects funded within these four programs specifically address the Commonwealth Government priorities to invest in and manage biotechnology, sustainable natural resource management, and improving food safety. Specifically, projects in 2000/01 will seek to identify and incorporate non-sugarcane genes into sugarcane to improve pest resistance and product quality. Crop management practices which improve industry profitability while maintaining the natural resource base are being developed through more sustainable fertiliser, crop protection and harvest and transport technologies. These projects also address high priority industry issues.

7.2.1 Program 1: Plant Improvement

Variety improvement through selection and plant breeding has contributed to sugar industry expansion and competitiveness for most of this century. There are growing demands from industry for new varieties to incorporate an expanding list of characteristics, including pest and disease resistances, improved sugar accumulation patterns, enhanced stalk characteristics for harvesting and milling, and plant attributes that impact on raw sugar quality.

Conventional plant breeding, interspecific hybridisation and applied biotechnology will combine to contribute directly to improved varieties. Improvement will be achieved through more efficient and effective breeding strategies including the selection of elite parents for crossing. Greater

understanding and control of flowering and interspecific hybridisation will increase the use of new and diverse parents.

Desired Outcome

- Enhanced profitability and other aspects of sustainability through development of improved varieties and plant breeding technologies.

Outputs for 2000/01

- Two hundred micro satellite markers for use in sugarcane biology will be produced and characterised.
- Enzyme assay techniques developed for use as markers for high CCS.
- Experiments established at 23 sites across the Australian sugar cane producing districts to investigate genotype X environment interaction.
- Varieties and clones resistant to sugarcane smut identified.
- An annotated collection of genes, expressed in sugarcane stems, produced and a sub-sample analysed for gene function.
- Transformation cassettes utilising viral promoters developed for use in sugarcane transformation.

7.2.2 Program 2: Crop Management

Sugar production grew at over 5% per annum on average over the 10-year period to 1997/98. Both area harvested and sugar yield per hectare increased over this period, after relatively little growth in the previous 10-year period. The recent increase in sugar yield reflects continued improvement in variety yield potential and crop management practices, after a period in which the gains from these factors were masked by the expansion of mechanical harvesting, the use of heavy in-field transporters, and deleterious soil biological and chemical factors arising through decades of sugarcane monoculture. However, in some production areas sugar content has declined, most likely due to a combination of plant and harvest-related factors.

The rate of expansion of the industry onto new land will not be as high in some areas in the immediate future, compared to the previous five years. Urban encroachment and competing land use activities will become increasingly important in some areas.

Reliance on plant breeding alone to provide production gains is undesirable. Emphasis in the areas of crop management and crop protection must be based on the need to close the gap between actual farm yields and the genetic potential of new varieties.

Desired Outcome

- Improved farm profitability through development and adoption of enhanced management practices and sustainable farming systems.

Outputs for 2000/01

- Response of sugarcane to high density planting evaluated at a range of locations and climates under commercial production conditions.
- Best practice irrigation guide produced for the Ord River Irrigation Area.
- Water use standards for sugarcane established for a range of soil types, canopy closures and seasons.
- Recommendations developed for farmers on nutrient management of trash blanketed paddocks.
- Farm business management workshops prepared and conducted in five producing districts.
- Guidelines developed on the use of juice monitoring information to assist nitrogen fertiliser management to improve CCS in the wet tropics.

7.2.3 Program 3: Crop Protection

Direct costs of pests and diseases result from both their impact on sugar production, and the costs of control measures such as insecticides and herbicides, the costs of prophylactic treatments, and the costs of quarantine.

Where there is substantial reliance on chemical control of pests in the sugar industry, R&D to develop alternative strategies is needed. Any individual pesticide usually has a limited useful life, since most target species will sooner or later develop resistance. Environmental considerations may limit the use of some chemicals even while they are still effective. Consequently, the sugar industry needs to move toward integrated pest management (IPM) strategies, which incorporate biological and cultural controls and cane varieties which are resistant to critical pests and diseases, which are conservative and efficient in pesticide use, and which are designed to slow the development of pest resistance.

Desired Outcomes

- Reduced economic and environmental impact of pests, weeds and diseases through greater use of integrated pest management.
- Enhanced safe exchange of sugarcane germplasm and varieties.

Outputs for 2000/01

- Integrated pest management strategies for each major pest of sugarcane documented for extension to growers.
- Updated weed management manual prepared and published.

- Information on root lesion nematodes added to the nematode identification database available on CD ROM.
- Evaluation of the impacts of nematodes on sugarcane yield decline completed.
- DNA diagnostic systems developed for ratoon stunting disease, Fiji disease and sugarcane mosaic virus.
- 5% of the sugarcane producing area in eastern Australia surveyed for the presence of sugarcane smut with emphasis on known susceptible varieties.

7.2.4 Program 4: Cane Harvest and Transport

Australia is a world leader in mechanised harvesting and the efficient transport of cane from the field to the mill. Largely as a result of this, the Australian sugar industry has been able to expand significantly over the past few decades while remaining internationally competitive. To maintain this position, however, requires continual development and ongoing improvement.

Current and continuing R&D will result in important improvements to harvester design and operation. New cleaning processes that greatly reduce extraneous matter while maintaining very low cane loss are nearing commercialisation and this together with improved harvester controls will reduce the losses and improve cane quality.

Desired Outcomes

- Improved efficiency of the harvest/transport system.
- Increased adoption of best practice harvest and transport systems.
- An optimised harvest/transport system as an integral part of the sugar value chain.

Outputs for 2000/01

- Best practice harvesting manual produced including improvements to cultural and harvesting practices.
- Grower and operator workshops conducted to achieve adoption of best practice.
- Field trials completed evaluating a new harvester base cutter design incorporating sloping blades.
- Prototype of the JetClean cane harvester cleaning system constructed.

7.3 Output 2 Management of R&D that results in improved sugar manufacturing equipment and processes

R&D funds to produce Output 2 are applied in the following programs:

Program 5	Sugar Manufacture
Program 7	Enhanced Marketability

Desired outcomes for each program are stated later in this section, as well as the outputs to be produced in 2000/01. The projects to be funded within each of the program strategies are listed in Attachment A.

Projects funded within these programs address the Commonwealth Government priorities of increasing trade and market access, improving food safety, and sustainable natural resource management. Projects funded in 2000/01 will be aimed at improving the profitability of sugar mill processing by enhancing the capacity of current equipment, improving sugar quality to maintain and enhance Australia's reputation in overseas markets, and exploring new uses for milling by products.
These projects also address high priority sugar industry issues.

7.3.1 Program 5: Sugar Manufacture

The significant expansion in the assigned area of cane in the past decade together with slowly increasing yields has resulted in conversion to continuous crushing and major mill expansions in some areas. Much of this expansion has been achieved using conventional technology although some innovative equipment has been utilised. The high cost of new milling capacity and declining sugar prices have inhibited further investment in new plant and consequently focussed R&D attention on low cost capital improvements and maximised throughput.

The continuing decline in the terms of trade for raw sugar is driving Australian sugar milling companies to seek further opportunities for better utilisation of capital and reduced manufacturing, maintenance and administration costs. It is expected that expansion of the production capacity of the industry will continue and that there will be opportunities for the use of innovative processing technology that increases throughput at minimal cost while maintaining quality.

Desired Outcomes

- Improved use of capital, capacity and resources to optimise profitability.
- Production of sugar of a quality required by the market through enhanced manufacturing processes.
- Value adding options and alternative uses for sugar, sugarcane and their by-products

Outputs for 2000/01

- New membrane filtration techniques for improved sugar quality evaluated and demonstrated to mills.
- New cane crushing equipment designs completed and evaluated.
- Feasibility study into production of activated carbon from sugarcane fibres completed.
- Effects of granulated, activated carbon from sugarcane fibres on metal absorption determined.

7.3.2 Program 7: Enhanced Marketability

Approximately 85% of Australia's sugar production is exported, predominantly as raw sugar. Nearly all of this is marketed by Queensland Sugar Limited which sells directly to users in importing countries. This has enabled good long-term relationships with the customers to be developed.

Australia has a reputation as a reliable supplier of high quality raw sugar and this situation has been particularly advantageous in periods of low world sugar prices when a marketing edge is needed to ensure sales. This has provided a good measure of stability to Australian producers and processors in a volatile market. Recently, competitors have improved their performance and quality and have lifted the market's perception of acceptable brand quality.

Raw sugar is expected to continue to be the Australian sugar industry's major export product. However it is highly likely the number of brands and range of specifications being offered will increase to satisfy customer demands.

Desired Outcomes

- Enhanced marketability of Australian sugar through responsiveness to customer requirements, including quality and reliability of supply.
- Optimised sugar storage and distribution to customers.

Outputs for 2000/01

- Technology for determining refinability of raw sugars formulated.
- Recommendations for best flow scheme arrangement determined for high pol sugar production.
- Breeding and selection strategies for reducing impurities in raw sugar determined.
- Genetic variation for polyphenol oxidase activity and juice colour determined in breeding populations of sugarcane.

7.4 Output 3 Management of R&D that results in reduced off-site impacts of the sugar industry

R&D funds to produce Output 3 are applied in the following program:

Program 6 Environmental and Natural Resource Management

Desired outcomes for the program are stated later in this section, as well as the outputs to be produced in 2000/01. The projects to be funded within each of the program strategies are listed in Attachment A.

Projects funded within Program 6 address the government priorities of sustainable natural resource management and maintaining our clean and green image. In 2000/01, projects specifically aim to reduce the movement of nutrients and chemicals from farms and mills to other ecosystems and to improve the occupational health and safety of industry personnel.

7.4.1 Program 6: Environmental and Natural Resource Management

The environmental issues which are to be the subject of R&D in this program are primarily related to off-farm and off-mill effects and the long-term aspects of maintaining the natural resource base. The on-site aspects of natural resource management (e.g., fertiliser and organic matter) associated with crop management and net returns will be considered in Program 2.

R&D conducted in this program is primarily concerned with evaluation and development of viable management practices that complement an environmental duty of care. However, in practical research both environmental and economic outcomes are likely, so that this distinction will not always be clear or predictable. Further, modifications of production practices are often the only feasible means of managing off-site damage.

Environmental issues will continue to be an important component of the R&D portfolio. This is to be expected for an industry adjacent to environmentally sensitive areas including World Heritage listed rainforests and the Great Barrier Reef. These environments are of national and international significance and provide the basis for a rapidly growing tourist industry. In addition, improving the occupational health and safety performance of the sugar industry will require a significant effort from all sectors of the industry. Agriculture is a high-risk industry for human health and safety. SRDC has joined the Farm Occupational Health and Safety Program managed by the Rural Industries R&D Corporation and supported by a consortium of R&D Corporations.

Desired Outcomes

- Effective management practices which maintain the environmental values of the sugar industry and the broader community and which minimise the off site environmental impacts of the industry.
- Improved occupational health and safety performance.

Outputs for 2000/01

- A draft manual of guidelines for reducing off-farm sediment movement finalised.
- Recommendations on management of acid sulphate soils to reduce the export of acid completed.
- Soil mapping of a potential expansion area in a sugar producing catchment completed and used to determine areas suitable for sugarcane production.
- Impact of runoff from sugarcane farms on the dissolved oxygen, nitrogen and phosphorus content of adjacent streams quantified.
- Farm health and safety audit checklist developed and information on the level of accidents on sugarcane farms collated.

7.5 Output 4 Management of R&D that results in enhanced whole of industry profitability, decision support tools and other communication activities

R&D funds to produce Output 4 are applied in the following program:

Program 8 Whole-of-Industry Competitiveness

Desired outcomes for the program are stated later in this section, as well as the outputs to be produced in 2000/01. The projects to be funded within each of the program strategies are listed in Attachment A.

Projects funded within Program 8 address the Commonwealth Government priorities of adoption of a whole of industry approach. Projects to be funded in 2000/01 will address the effect on industry profitability of different cane supply options in a number of mill areas as well as seeking to improve the methods of technology transfer and training of industry leaders. The whole-of-industry approach was also given a higher priority by the industry during the revision of the SRDC R&D Plan.

7.5.1 Program 8: Whole-of-Industry Competitiveness

The awareness of the need to consider impacts of components of the value chain across the whole of industry performance has increased in the past four years. R&D has assisted in this process by addressing the interactions that occur when one element of the value chain is modified and impacts elsewhere in the chain.

SRDC's establishment of this program in its previous R&D Plan 1995–2000 was exploratory. Despite repeated efforts to attract proposals for R&D activities in the broader aspects of industry competitiveness, only limited success has been achieved. SRDC considers that the wider acceptance of the importance of whole-of-industry issues and the adoption of a systems approach to several important issues will see an expansion of R&D within this program during the plan period, including projects commissioned to meet a particular priority purpose.

Desired Outcomes

- Improved decision making processes for the benefit of the sugar industry and the wide Australian community.
- Enhanced understanding of impacts of elements of production, harvesting and manufacturing on whole-of-industry competitiveness.

Outputs for 2000/01

- Cane supply option analyses completed and pilot scheme initiated to test predictions of cost savings to industry.
- Needs evaluation survey for women in the sugar industry completed in the Herbert River district.
- Action Learning workshops to improve marketing skills of sugar industry technology transfer personnel completed.
- Utility of seasonal climate forecasts for crop and harvest management decision making assessed by industry reference panel.

8 MULTI PROGRAM ACTIVITIES

The SRDC R&D Plan 1999–2004 defines three multi-program activities as follows:

MPA1: Effective and Efficient use of R&D Resources
MPA2: Management of SRDC
MPA3: CP2002 — Accelerated Enhancement of Productivity and Profitability for the Australian Sugar Industry.

MPA3 was discussed in detail in Section 4, commencing on page 9. The desired outcomes, activities in each strategy and the outputs for 2000/01 are discussed for MPA1 and MPA2 in the remainder of this section.

8.1 MPA1: Effective and Efficient Use of R&D Resources

The resources of many scientific and academic institutions and of private organisations complement those of the sugar industry R&D organisations, BSES and SRI, in many areas. SRDC ensures that the quality of projects and the focus on priority industry and community issues is maintained through its R&D priority setting process. This uses a system of working parties for each program to advise the Board on project priorities. The process assists SRDC to provide effective feedback to all project proponents.

8.1.1 Desired Outcomes

- R&D resources allocated in line with industry and government priorities following industry and community consultation.
- Expanded base of research providers serving the sugar industry.

8.1.2 Outputs for 2000/01

- R&D provider base serving the sugar industry maintained above 1990 level.
- Key industry, government and R&D provider stakeholders involved in identifying priority issues and allocating R&D resources.
- Scholarships provided for postgraduate students.

8.1.3 Activities in 2000/01

Strategy MPA1.1 *To develop an effective and transparent process for the allocation of R&D resources across the broad program areas of the R&D Plan.*

SRDC used a benefit model across the sugar industry production chain to set indicative proportions of funding in each of the R&D programs of its R&D Plan 1999–2004. The model provides estimates of where maximum benefits to the industry and community would accrue from R&D investment.

In 2001/01, SRDC is seeking a project to update the information sets used in this process, to develop an improved process for valuing environmental benefits from R&D, and to identify a method to estimate investment in sugar industry R&D by all providers. The project will be considered for funding at the March 2001 Board meeting.

Strategy MPA1.2 *To establish working parties for each program area, and cross-program activity where required, to advise SRDC on priorities for R&D.*

SRDC plans to continue with its system of working parties for each of its eight R&D programs in 2000/01. Each working party is chaired by an SRDC Director and includes members with scientific, industry and other relevant expertise. They provide advice to SRDC on R&D project ranking, and they are also involved in the review of projects and sub-program areas. Working Party membership will be reviewed according to normal policy at the July 2000 board meeting.

Strategy MPA1.3 *To invite applications for R&D project funding from a wide range of R&D providers in Australia and overseas.*

An objective of SRDC is to achieve enhanced research activity for the industry by the major Australian research institutions. SRDC recognises that the dedicated industry research bodies (BSES and SRI) have a particular capability both to identify needs and opportunities and to relate the results of research to industry applications. Therefore, the Corporation strongly encourages the involvement of other research institutions in research projects which are linked to these industry bodies. This will help to ensure a focus on industry needs, access to background knowledge of the industry and extension of results, while achieving a broader involvement of Australian research expertise directly to the resolution of industry problems.

Following Ministerial approval of this AOP for 2000/01, contracts will be entered into with the respective R&D organisations for the 18 new projects to commence in 2000/01.

SRDC will again advertise nationally in July 2000 inviting preliminary project proposals provided funds are available for new projects to commence in the 2001/02 financial year.

Strategy MPA1.4 *To develop the human resource base for the sugar industry.*

A total of $0.34 million has been allocated in 2000/01 for post graduate scholarships and R&D service awards. Post graduate scholarships are awarded for study at Honours or PhD level in a range of disciplines relevant to the sugar industry, and applications will be invited in July 2000. At least two new scholarships will be awarded to commence in the 2001 calendar year. The scholarships current in 2000/01 are listed in Attachment A.

Strategy MPA1.5 *To consult with industry representative organisations and research organisations.*

SRDC maintained an active program of consultation with the industry and the research community during 1999/00. This involved discussions with the representative bodies of the industry (Australian Cane Farmers Association, Australian Sugar Milling Council and the Australian Cane Growers Council), and with the two main industry R&D organisations (BSES and SRI). There were also consultations with other major Australian research institutions, including CSIRO, Universities, various state and federal bodies as well as industry organisations such as NSW Sugar Milling Co-operative Ltd., CSR, Bundaberg Sugar, Sugar North and Mackay Sugar.

SRDC will again consult with its industry representative organisations on at least two occasions in 2000/01. Major items to be discussed will include magnitude and collection of the levy, the SRDC R&D budget, the 1999/00 SRDC Annual Report and other matters of mutual concern.

No payments are to be made to the representative bodies for any expenses incurred in relation to these consultations or for any other purpose.

8.2 MPA2 — Management of SRDC

SRDC has adopted a policy of maintaining a low-cost administrative structure while providing effective, efficient and accountable management of its resources. The operation of SRDC as a proportion of total budget is expected to be less than the average of all RDC's. This cost will be distributed proportionally across the program structure.

8.2.1 Desired Outcomes

- A low-cost administrative structure to provide effective, efficient and accountable management of SRDC resources.
- An improved project management system to ensure research provider accountability.

8.2.2 Outputs for 2000/01

- Computer-based project and financial management systems operating satisfactorily.
- SRDC's R&D Plan, annual operational plan and annual report produced as required by the PIERD Act and the CAC Act.
- Communication with R&D providers on R&D project funding, scientific and financial reporting and reviews.

8.2.3 Activities in 2000/01

Strategy MPA2.1 *To develop and maintain efficient and effective computer-based project and financial management systems.*

SRDC operates a computer based financial management system linked to its project management system. The project management system incorporates disk or email project submission for R&D providers. In early 2000 SRDC established its website and in 2000/01 plans to make its project application system available direct from this website.

Strategy MPA2.2 *To meet the statutory obligations of SRDC, in particular those required under the PIERD Act and the CAC Act.*

This annual operation plan (AOP) is the first to be prepared since revision of the SRDC R&D Plan. The AOP format has been revised to conform with the outcome/output framework required under performance reporting of the CAC Act 1997, while retaining compliance with the requirements of the PIERD Act 1989.

Strategy MPA2.3 *To monitor the progress of R&D projects through milestone reports and project and sub-program reviews.*

SRDC will continue to monitor the progress of projects which it funds. The adoption of a whole-of-life project agreement for all projects from 1998/99 requires regular milestone and financial reporting. Milestones average two to three per year for each project and result in improved accountability. Formal project reviews will be conducted for a small number of projects, in some cases required at a particular milestone. Most project reviews have been replaced by sub-program area reviews to ensure that R&D resources continue to be directed to priority issues.

Sub-program area reviews are planned in 2000/01 for biotechnology, cane harvest and transport, global sugar market access, CP2002, weed management and sugar quality.

Strategy MPA2.4 *To monitor the acquittal of R&D funds provided to research providers;*

As required in its project agreement SRDC will continue in 2000/01 to monitor the provision of financial statements by R&D providers within 3 months of the end of the financial year and within 3 months of the termination date of the project. These statements detail receipts, income, outgoings and expenditure received or incurred together with a stocktake of project equipment.

Strategy MPA2.5 *To review SRDC performance against its corporate and statutory objectives.*

The revised SRDC R&D Plan 1999–2004 contains Key Performance Indicators at the corporate level as well as performance indicators within each of the R&D programs. In 2000/01, SRDC intends to develop a project to obtain relevant benchmarks against which future performance can be measured.

ATTACHMENT A

PROJECTS AND SCHOLARSHIPS IN 2000/01

Program 1: Plant Improvement

Strategy 1.1 *To improve the efficiency and effectiveness of sugarcane breeding, with emphasis on improved CCS characteristics, and speed the release of new varieties*

Continuing Projects • PIERD

BSS231	Development and application of spatial analysis to improve precision in selection trials	Jan 00–Dec 02	Ms J Stringer	$29,000
CTA028	Evaluation and re-structuring of regional selection programs to maximise efficiency and speed of cultivar release	Jul 97–Jun 03	Dr S Chapman	$185,302
CTA046	Perfect markers for sugarcane mapping	Jul 99–Jun 02	Dr L McIntyre	$36,000
CTA049	Characterisation and maintenance of the Australian sugarcane mapping populations	Jul 99–Jun 03	Dr L McIntyre	$105,629
ICB006	Map-based cloning of rust resistance	Mar 00–Mar 01	Dr A D'Hont	$8682
SCU001	Characterisation of sugarcane microsatellites	Jul 97–Jul 00	Prof R Henry	$13,931
UQ023	Optimisation of experimental design and analysis for variety trials to maximise genetic gain	Jul 96–Mar 01	Assoc Prof K Basford	$1000
BSS169	G × E interactions on ratooning of clones under trash blankets under cool/wet conditions	Jul 96–Jul 00	Dr T Bull	$4000
BSS179	Development of a strategy for selection of high-CCS cultivars for high fertility environments in northern Queensland	Jul 97–Dec 03	Dr N Berding	$65,000
BSS214	Pre-emptive, off-shore screening of Australian germplasm for resistance to sugarcane smut	Jul 98–Jun 03	Mr B Croft	$86,786

Continuing Projects • CP2002

BSS219	Production of progeny from high-CCS clones and their exploitation for G × E for high CCS and acceptable ideotype for the wet tropics	Jun 99–Jun 02	Dr N Berding	$109,002

New Projects • PIERD

BSS250	Improving selection systems and data analysis in sugarcane breeding programs	Jul 00–Dec 05	Dr P Jackson	$99,484

Strategy 1.2 *To identify genes for novel traits and insert them efficiently into plant breeding populations, having regard for customer acceptance of the technology*

Continuing Projects • PIERD

BSS237	Identification of canegrub-resistant transgenic sugarcane lines for commercial evaluation	Jul 99–Jun 02	Dr P Allsopp	$67,734
CTA047	Introgression of new genes from *Saccharum officinarum*	Jul 99–Jun 04	Dr P Jackson	$117,114
CTA035	A sugarcane gene bank	Jul 98–Jul 00	Dr J Manners	$9272
QUT002	Development of transformation cassettes for sugarcane	Jul 97–Jul 00	Dr R Harding	$5000
CTA048	The transfer of high CCS traits from wild relatives to sugarcane using biochemical markers	Jul 99–Jun 03	Dr C Grof	$110,145

New Projects • PIERD

CTA052	Functional genomics for enhanced sugar accumulation in sugarcane	Jul 00–Jun 03	Dr J Manners	$114,836

Strategy 1.3 *To increase the rate and extent of uptake of new varieties*

Continuing Projects • PIERD

BSS196	Selection and commercial use of early CCS varieties	Jul 97–Jun 01	Mr A Rattey	$37,000

Continuing Projects • CP2002

BSS234	Best management practice for sugarcane varieties	Apr 99–Jun 02	Mr R Kelly	$160,044

Other PIERD Projects	**$531,202**
Total — PIERD	**$1,618,435**
Total — CP2002	**$ 269,046**
Total — Program 1	**$ 1,887,481**

Program 2: Crop Management

Strategy 2.1 *To improve farm profitability and develop sustainable crop management practices*

Continuing Projects • PIERD

BSS181	Increasing sugarcane productivity through development of integrated surface drainage systems for low lying canelands	Jul 97–Jun 02	Mr J Reghenzani	$104,000
CSR022	Best-practice irrigation management to maximise profitability and ensure sustainability in the Ord sugar industry	Jul 96–Jun 01	Dr A Wood	$117,568
CTA038	Irrigation risk management strategies to reduce water use and maximize profitability: a paradigm shift in performance to $ per unit of water	Jul 98–Jun 02	Dr G Inman-Bamber	$123,240
NISN01	National Irrigation Science Network	Apr 00–Mar 03	Mr J Cape	$10,000
BSS155	Factors affecting the residual value of lime	Jul 96–Jun 01	Dr G Kingston	$30,709
BSS180	Assessing clonal and nitrogen interaction on CCS in sugarcane in the wet tropics	Jul 97–Jun 00	Mr A Hurney	$7000

BSS199	Improving the management of acid and sodic soils with green trash retention using calcium based ameliorants/products	Jul 98–Jun 01	Mr B Schroeder	$63,000
CSR024	Improving the environment for sugarcane growth through the amelioration of soil acidity	Jul 96–Jun 01	Dr A Wood	$37,136
CTA022	Short and long term impacts of green cane trash blanketing on soil fertility	Jul 96–Jun 01	Dr P Thorburn	$39,976
CTA029	Monitoring cane at the mill to improve nitrogen management on the farm	Jul 97–Jun 01	Dr B Keating	$76,094
BSS212	Investigation of the limits to high density planting	Jul 98–Jun 01	Dr T Bull	$51,737
BSS241	Regional evaluation of high density planting (Part funding)	Jul 99–Jun 04	Dr T Bull	$116,471
BSS143	Strategic tillage to reduce soil structural degradation and improve productivity	Jul 95–Jun 01	Dr M Braunack	$63,660
BSS197	Products and mechanisms for amelioration of sodic soils	Jul 97–Dec 01	Mr G Ham	$45,487
YDV002	Yield Decline Joint Venture Phase 2 (part funding)	Jul 99–Jun 05	Dr A Garside	$174,355
CTA030	Overcoming constraints to high yield and CCS in large and lodged cane crops	Jul 97–Jun 01	Dr S Chapman	$59,074

Continuing Projects • CP2002

BSS232	Improved nutrient management in the Australian sugar industry	Jul 99–Sep 02	Mr B Schroeder	$109,785
CLW009	Improving yield and ccs in sugarcane through the application of silicon based amendments	Jul 99–Dec 02	Dr A Noble	$81,560
BSS220	Understanding why potential field ccs is not realised at the factory	Jan 99–Dec 01	Mr A Hurney	$231,711
BSS221	Environmental stimuli for sugarcane suckering in the wet tropics	Jan 99–Dec 01	Mr A Hurney	$83,287

UQ034	Analysis of sugarcane productivity trends in the wet tropics at a district level	Jan 99–Dec 00	Dr K Basford	$27,117
YDV002	Yield Decline Joint Venture Phase 2 (Part funding)	Jul 99–Jun 05	Dr A Garside	$113,537

New Projects • PIERD

CTA051	Increased profitability and water use efficiency through best use of limited water under supplementary irrigation	Jul 00–Jun 05	Dr G Inman-Bamber	$14,775

Strategy 2.2 *To improve plant establishment, fertiliser placement and trash handling abilities*

Continuing Projects • PIERD

BSS208	Improving planting systems for sugarcane	Jul 98–Jun 03	Mr B Robotham	$111,451

Strategy 2.3 *To improve on-farm decision making*

Continuing Projects• PIERD

BSS217	Coordinated farm business management for the Australian sugar industry	Jan 99–Aug 02	Mr D Bigg	$95,020
BSS182	An integrated Decision Support System (DSS) to improve the utilisation of productivity data by extension, research and productivity programs	Jul 97–Dec 00	Mrs J Cox	$13,908
CSR026	A reference booklet for canegrowers on the nutrition and fertilizing of sugarcane for different soil types	Jul 98–May 00	Dr A Wood	$10,000
BSS206	A participatory approach to improving furrow irrigation efficiency	Jul 98–Jun 00	Mr A Linedale	$13,292
DPI013	Development of strategies to reduce cadmium accumulation by grain legumes in sustainable crop rotations	Jul 98–Jun 01	Dr M Bell	$30,000

Continuing Projects • CP2002

BSS222	Benchmarking and improving the financial performance of the sugar industry particularly in the northern districts	Jan 99–Jun 02	Mr G McMahon	$60,000
BSS248	Facilitate the accessibility of productivity data by sugar cane farm managers	Jan 00–Dec 00	Mrs J Cox	$16,162
CTA045	Improving CCS in the wet tropics via block-specific monitoring of N in cane delivered to the mill	Jul 99–Jun 02	Dr B Keating	$118,828
BCB001	Overcoming on-farm constraints to productivity and profitability in a wet tropical area	Apr 99–Jun 02	Mr M Goodson	$51,964
CSR028	Ripener management strategies for the Australian sugar industry	Aug 99–Jun 01	Dr L McDonald	$83,987
DPI014	Sugar farming systems development & demonstration on the wet tropical coast	Jul 99–Jun 02	Mr R Steel	$226,230

Total — PIERD	**$1,407,953**
Total — CP2002	**$1,204,168**
Total — Program 2	**$2,612,121**

Program 3: Crop Protection

Strategy 3.1 *To develop effective IPM programs targeting high-priority pests, weeds and diseases.*

Continuing Projects • PIERD

BSS166	Effect of farming practices on canegrub incidence	Jul 96–Dec 00	Dr P Allsopp	$95,852
BSS201	Determining the biology of Rhopaea canegrubs in the NSW and Queensland sugar industries	Jul 98–Dec 01	Mr P McGuire	$35,850
BSS203	Further characterization of pathogenicity genes from Clavibacter xyli subsp. xyli, causal organism of ratoon stunting disease	Jul 98–Jun 01	Dr S Brumbley	$64,289

BSS236	Management strategies for *Rhyparida* in southern Queensland	Jul 99–Dec 01	Dr P Allsopp	$74,793
BSS239	Support for an ARC project to investigate genetic diversity of Clavibacter xyli subsp. xyli isolates	Jul 99–Jun 02	Dr S Brumbley	$7000
BSS186	Development of a method to aid decision making on herbicide use for Australian canegrowers	Jul 97–Dec 00	Mr T O'Grady	$53,415
BSS160	Integrated pest management of soldier fly	Jul 96–Jul 00	Dr P Samson	$15,217
CTA043	Provision of improved varieties and pathology services for the Ord Sugar Industry	Jul 98–Jun 02	Dr P Jackson	$50,368
WAA002	Sugarcane smut variety screening	Jul 99–Jul 00	Dr J Sherrard	$1000

Continuing Projects • CP2002

BSS243	Chlorotic streak disease of sugar cane	Jul 99–Oct 02	Dr R Magarey	$77,013
CE004	Environmental factors affecting Adelina in the Burdekin region	Jul 99–Jun 02	Dr D Dall	$85,597
IPB001	Strategies to control greyback canegrub in early harvested return crops	Jul 99–Jul 02	Mr K Chandler	$64,711
BSS223	Management of greyback canegrub in sugarcane: from research to practice	Jan 99–Jul 03	Mr R Cocco	$49,367
BSS224	Implementation of management strategies to address sugarcane weevil borer in far north Queensland	Jan 99–Dec 02	Mrs D Telford	$70,574
BSS225	Enhanced adoption of integrated pest management in sugarcane	Jan 99–Dec 01	Dr P Samson	$139,186
BSS226	Farming systems that optimise the control of greyback canegrubs by BioCane	Jan 99–Jun 02	Mr D Logan	$65,210
BSS246	Expanded registrations for Metarhizium strains against canegrubs	Jan 00–Jun 02	Dr P Sampson	$151,747

CE003	Control of greyback canegrubs with a microsporidian pathogen	Nov 98–Jun 02	Dr D Dall	$106,835
BSS245	Enhancing resistance to yellow spot disease	Sep 99–Jun 02	Dr R Magarey	$12,270

Strategy 3.2 *To improve incursion management*

Continuing Projects • PIERD

BSS230	Survey of sugarcane in eastern Australia for sugarcane smut	Jan 99–Oct 00	Mr B Croft	$7804

New Projects • PIERD

BSS249	Preparedness for borer incursion	Jul 00–Jun 03	Dr P Allsopp	$44,788

Strategy 3.3 *To improve soil health*

Continuing Projects • PIERD

SAI001	Preparation of a CD Rom library of plant-parasitic nematodes	Oct 98–May 03	Dr J Nobbs	$10,007
YDV002	Yield Decline Joint Venture Phase 2 (Part funding)	Jul 99–Jun 05	Dr A Garside	$174,355

Continuing Projects • CP2002

YDV002	Yield Decline Joint Venture Phase 2 (Part funding)	Jul 99–Jun 05	Dr A Garside	$113,537

Strategy 3.4 *To develop methodologies for the safe exchange of germplasm*

Continuing Projects • PIERD

BSS187	Implementation of sensitive pathogen indexing methods in sugarcane quarantine	Jul 97–Jul 00	Dr P Whittle	$8000
NTU001	Development of tests for the yellow leaf, white leaf and grassyshoot phytoplasmas and determination of their importance in Australian sugarcane	Jul 98–Jun 01	Dr K Gibb	$70,130
UQ024	Development of DNA based diagnostic systems for sugarcane pathogens	Jul 96–Jul 00	Dr D Maclean	$9000

Total — PIERD	**$721,868**
Total — CP2002	**$936,047**
Total — Program 3	**$1,657,915**

Program 4: Cane Harvest and Transport

Strategy 4.1 *To improve the efficiency of harvest/transport*

Strategy 4.2 *To identify and implement best practice*

Continuing Projects • CP2002

BSS227	A participatory approach towards improving industry sector profits through improved harvest efficiency	Jan 99–Jun 02	Mr T Willcox	$174,155
MCB001	Lifting the viability of the Mossman sugar industry by improving the cane supply	Jul 99–Jun 02	Mr A Rudd	$18,660

New Projects • CP2002

NCA008	Review of harvester performance analysis systems	Jul 00–Jun 01	Assoc Prof H Harris	$20,270

Strategy 4.3 *To optimise the harvest/transport system within the sugar value chain*

Continuing Projects • CP2002

SRI090	An extended model of the economic impact of EM components on the sugar industry	Jul 99–Dec 00	Dr P Hobson	$40,438
BSS244	Impact of chopper harvesting on the translation of field CCS to factory	Jul 99–Jun 01	Mr C Norris	$77,321

Strategy 4.4 *To improve harvesting, haulout and transport equipment design*

Continuing Projects • PIERD

BSS207	A program to minimise stool damage and soil in the cane supply	Jul 98–Dec 01	Mr A Linedale	$64,765
JCU019	Close-range, microwave radar for automatic control of base-cutter height and other cane harvester operations	Jul 99–Jul 02	Dr G Woods	$52,510
NCA004	Improvements in basecutter design and cane feeding	Jul 97–Dec 00	Assoc Prof H Harris	$47,700
BSS241	Regional evaluation of high density planting (Part funding)	Jul 99–Jun 04	Dr T Bull	$128,237

Continuing Projects • CP2002

NCA006	Developing and improving the JetClean harvester cleaning system	Jan 99–Dec 01	Assoc Prof H Harris	$38,888

New Projects • PIERD

SRI108	Reduced dirt in the cane supply through implementation and improvement of the base cutter height control system	Jul 00–Jun 01	Dr M Schembri	$59,766

Total — PIERD **$352,978**
Total — CP2002 **$369,732**
Total — Program 4 **$722,710**

Program 5: Sugar Manufacture

Strategy 5.1 *To improve profitability of sugar mill processing*

Continuing Projects • PIERD

SRI067	Investigation of reduced sucrose solubility in molasses	Jul 97–Jul 00	Dr L Edye	$15,646
US002	Syntheses of polymer additives for juice processing capacity and performance	Mar 98–Mar 01	Dr A Cheung	$74,291
JCU010	Mathematical modelling of circulation and crystallisation in vacuum pans	Jul 97–Jul 00	Dr J Harris	$1500
JCU011	Crushing of cane and bagasse: finite element model applications	Jul 97–Dec 00	Assoc Prof J Loughran	$21,355
JCU020	Experimental and numerical investigation to improve the dewatering of prepared sugar cane and bagasse	Jul 99–Dec 02	Assoc Prof J Loughran	$112,734
JCU021	An experimental study of boiling in calandria tubes	Jul 99–Jul 01	Dr J Harris	$25,000
SRI099	Develop procedures for increasing sugar recovery from final massecuites	Jul 99–Jun 00	Mr R Broadfoot	$5000
SRI084	The application of NIR based on-line monitoring in the sugar manufacturing process	Jul 98–Jul 00	Dr L Edye	$4814
SRI079	Advanced spreader design for increased boiler capacity and firing low moisture predried bagasse	Jul 98–May 02	Dr T Dixon	$41,066
SRI083	Storage of liquor and other pan stage materials for later processing	Jul 98–Jul 00	Dr R Broadfoot	$9339

Continuing Projects • CP2002

SRI088	Increasing milling unit capacity by improving mill feeding performance	Feb 99–Jun 02	Mr G Kent	$113,949
SRI089	Improve the hindered settling, thickening and withdrawal of mud in the SRI clarifier	Feb 99–Jun 01	Mr R Steindl	$28,194
SRI091	Advanced secondary air system for increased furnace firing capacity and boiler steam capacity	Jul 99–Dec 01	Dr T Dixon	$36,805
CSU001	An on-line cane monitoring system to measure the extraneous matter present in billet sugar cane	Mar 98–Dec 00	Dr W Moore	$21,093
JCU018	Improved batch pan monitoring, control and optimisation — a soft sensor approach	Mar 99–Jun 01	Dr P Schneider	$55,000

New Projects • PIERD

SRI102	An improved roll shell material for longer life	Jul 00–Jun 02	Dr G Davy	$42,803
SRI101	An improved stirrer design for increased productivity and energy efficiency in batch pans	Jul 00–Jun 02	Dr R Broadfoot	$53,402
JCU023	Design and preliminary testing of juice separation technology to aid extraction and dewatering	Jul 00–Dec 02	Assoc Prof J Loughran	$47,550
SRI104	Improved pan stage productivity through the provisions of a crystal sizing system	Jul 00–Jun 01	Mr R Steindl	$60,569
SRI105	Factory trial for the implementation of liquor storage	Jul 00–Oct 01	Mr B Lavarack	$30,638

Strategy 5.2 *To enhance sugar quality through the adoption of improved processes in sugar mills*

Continuing Projects • PIERD

SRI095	Fundamental studies on the chemistry of clarification	Jul 99–Jun 03	Dr W Doherty	$87,352
SRI096	Application of membrane filtration for pan stage capacity increase and improved sugar quality	Jul 99–Jun 01	Mr R Steindl	$102,489

Continuing Projects • CP2002

MCM001	The effect of clean cane on the economics on the sugar production in the Mossman Mill area	Jul 99–Jun 01	Mr J Allen	$56,113
SRI093	Improve the purging and washing efficiency of continuous high grade fugals	Jul 99–Jun 01	Dr R Broadfoot	$25,000

New Projects • PIERD

SRI100	Clarification of evaporator syrup for improved sugar quality and yield	Jul 00–Jun 02	Mr R Steindl	$47,194

Strategy 5.3 *To broaden the product range of sugar and other products*

Continuing Projects • PIERD

US001	Activation of the fibrous components of the sugar cane for removal of heavy metals from waste water	Sep 97–Aug 00	Dr M Valix	$2952

Other PIERD Projects	**$70,669**
Total — PIERD	**$856,363**
Total — CP2002	**$336,154**
Total — Program 5	**$1,192,517**

Program 6: Environmental and Natural Resource Management

Strategy 6.1 *To reduce the losses of nutrients and chemicals and sustain the land and water resource*

Continuing Projects • PIERD

BSS191	Loss patterns of pesticides and nutrients in surface drainage water from irrigated individual canefields	Mar 98–Jun 01	Mr G Ham	$63,497
CTA031	A stocktake of the levels and sources of nitrate in groundwaters associated with sugarcane areas	Jul 97–Dec 00	Dr P Thorburn	$35,656
DNR001	Pesticide transport in sugar production systems	Jan 97–Dec 00	Mr P Hargreaves	$19,044
DNR002	Environmental impact of nitrate retention at depth	Jul 97–May 02	Dr V Rasiah	$78,000
JCU016	Quantification of effects of cane field drainage on stream ecology	Jul 98–Dec 01	Assoc Prof R Pearson	$99,916
CLW007	Quantifying and managing sources of sediments and nutrients in low-lying canelands	Jul 98–Dec 01	Dr C Roth	$69,987
BSS238	Raising awareness and adoption of sustainable cane growing practices	Jul 99–Jun 01	Ms I Christiansen	$82,618
JRA001	Towards long-term sustainability of sugarcane farming in the Johnstone River catchment	Jul 97–Oct 00	Mr B Stewart	$8000
BSS173	Quantifying the socio-economic impact of harvesting residue retention systems	Oct 96–Feb 02	Ms F Small	$138,780
DNR005	Develop a water resource management strategy for the Mackay coastal aquifer system	Jul 96–Jul 00	Mr R Sorensen	$17,443
DNR004	Prediction and management of acidity production and export from acid sulphate soils used for sugar production	Jul 97–Jun 01	Mr T Gardner	$76,791
NA003	Hydrologic effects of flood gate management on coastal floodplain agriculture — the sugarcane component	Jul 99–Jun 04	Mr M Hughes	$36,825

NSC003	Improving the quality of drainage water from NSW canelands	Jul 99–Sep 02	Mr R Beattie	$83,101

New Projects • PIERD

JCU024	Water quality and unexplained fish kills in sugarcane districts of northern Queensland	Jul 00–Jul 02	Prof R Pearson	$37,723
LCC001	Sugar Industry Riparian Management Guidelines	Jul 00–Dec 00	Dr S Lovett	$25,000

Strategy 6.2 *To reduce the environmental impact of sugar manufacturing operations by the development and adoption of sustainable practices and processes*

Continuing Projects • PIERD

SRI077	Microbiology of sugar mill cooling towers and spray ponds; potential for Legionella control	Jul 98–Dec 01	Dr M Dawson	$43,326

Strategy 6.3 *To enhance communication between the sugar industry and the community*

Continuing Projects • PIERD

BSS125	Pesticide residues in the Queensland sugar industry	Jul 94–Sep 00	Mr B Stickley	$3660
BSS202	Resource assessment for sustainable land development and management of new canegrowing areas	Jan 99–Dec 01	Ms K Webster	$106,937
CTA039	Improved integrated resource planning in the Australian sugar industry	Jul 98–Oct 01	Dr A Johnson	$106,752

Strategy 6.4 *To improve the occupational health and safety of sugar industry personnel*

Continuing Projects • PIERD

OHS001	Rural R&D Corporations Farm Health & Safety Program	Mar 00–Jun 02	Dr R Prinsley	$20,000

Total — PIERD	**$1,153,056**
Total — CP2002	**$0**
Total — Program 6	**$1,153,056**

Program 7: Enhanced Marketability

Strategy 7.1 *To provide sugar products and brands that meet the quality requirements of customers*

Continuing Projects • PIERD

SRI097	Costs and benefits of the CBA boiling scheme for high pol sugar production	Jul 99–Jul 00	Dr R Broadfoot	$5239

Strategy 7.2 *To improve sugar quality*

Continuing Projects • PIERD

BSS164	Identification of primary phenotypic traits that determine polysaccharide gum potential	Jul 96–Dec 00	Dr M Cox	$45,000
CTA042	Does reducing polyphenol oxidase activity in transgenic sugarcane lead to lower crystal colour?	Jul 98–Jun 01	Dr C Grof	$112,600
CTA034	Predicting the incidence and magnitude of polysaccharide impurities and identifying the causal field-factors	Jul 98–Aug 03	Dr G Bonnett	$88,082
JCU017	Development of a test for polysaccharide in raw sugar	Jan 99–Jun 01	Ms M Wood	$76,402
UQ035	Molecular ecological studies on the formation of polysaccharide impurities in raw sugar	Jul 99–Jun 02	Dr L Sly	$96,346

New Projects • PIERD

SRI103	UV-Vis and NIR reflectance measurements of raw sugar quality	Jul 00–Jun 02	Dr L Edye	$46,621

Strategy 7.3 *To improve sugar transport, storage and distribution*

Strategy 7.4 *To increase demand for sugar products*

Total — PIERD **$470,290**
Total — CP2002 **$0**
Total — Program 7 **$470,290**

Program 8: Whole-of-Industry Competitiveness

Strategy 8.1 *To improve decision-making to optimise industry profitability*

Continuing Projects • PIERD

ARP001	Australian Rural Leadership Program	Jul 92–Jun 01	Mr M Beckingham	$37,500
BSS193	Developing marketing skills for sugar industry technology transfer personnel	Jul 97–Jun 01	Mr G McMahon	$10,834
BSS235	A pilot study to develop education with focus on sugar for women in the Herbert River district	Jul 99–Jun 02	Ms D Brown	$10,260
CTA036	Seasonal climate forecasting to improve industry competitiveness	Jul 98–Dec 02	Dr R Muchow	$122,811
CVA001	Climate Variability in Agriculture Program	Jul 98–Jun 01	Dr B White	$30,000

Continuing Projects • CP2002

BSC006	Mourilyan Sugar Industry strategic plan	Feb 00–Jul 01	Mr W Yates	$45,000
SJF001	The South Johnstone Sugar Industry strategic study	Jan 00–Jul 01	Mr P Grima	$30,000
BSS233	Improving technical communication within the sugar industry: development of a best practice resource package for greyback canegrub	Jul 99–Jun 00	Ms J Marsh	$5000

BSS247	Implementation of the Rocky Point Strategic Plan as a model for local area industry development	Jul 99–Jun 02	Mr B Laurence	$43,196
MA001	Better management practice in the Australian sugar industry: CP2002	Jan 99–Jun 02	Mr E Colquhoun	$119,280
MUL001	Developing a new approach to extension for widespread adoption of best management practice	Apr 00–Jun 02	Mr T Crook	$46,590

New Projects • PIERD

SRI107	Improved transfer to mills of technology developed by the Sugar Research Institute	Jul 00–Jun02	Dr V Mason	$58,798
UQ037	Development of an all-weather sugarcane crop yield model using satellite image data	Jul 00–Feb 02	Mr M Noonan	$18,560
SRI106	Electronic collection of harvest/transport data	Jul 00–Jun 01	Mr P Everitt	$32,045

New Projects • CP2002

MA002	Short term survival workshops for Mourilyan and Balunda	Jul 00–Dec 00	Mr W Yates	$9500

Strategy 8.2 *To evaluate the impacts of elements of the value chain on whole-of-industry competitiveness*

Continuing Projects • PIERD

CTA037	International collaboration on systems approaches to profitable sugar production	Jul 98–Jun 02	Dr R Muchow	$18,000
MSA001	Cane supply options analysis for maximising whole industry profitability. A case study for Mackay	Jul 97–Jun 01	Mr J King	$57,992

Continuing Projects • CP2002

CTA044	Delivering the capability to evaluate alternative cane supply arrangements across the sugar industry using a whole industry systems approach	May 99–Jun 02	Dr R Muchow	$130,824
MSF001	Improving profitability of the Maryborough sugar industry by assessing the options for cane supply and season length	Jul 99–Jun 02	Mr F Sestak	$19,250

New Projects • PIERD

CTA053	Integrated management of ash and colour in the field	Jul 00–Jun 03	Dr P Jackson	$117,058

Total — PIERD	**$513,858**
Total — CP2002	**$448,640**
Total — Program 8	**$962,498**

Scholarships • Continuing Scholarships

STU020	D Harrison — Transgenes as tools for understanding the inheritance and expression of genes in sugar cane	Jun 97–Dec 00		$12,083
STU021	I Searle — Cloning of nodulation genes for genetic engineering of nodulation and nitrogen fixation in sugar cane	Feb 97–Aug 00		$4463
STU022	R Raicu-Baclagian — Integrated GPS/GIS for use in monitoring, modelling and managing cane harvest transport systems	Mar 98–Feb 01		$19,307
STU023	L Pickering — Transgene-mediated resistance to sugarcane mosaic virus	Feb 98–Feb 01		$18,830
STU024	G Singh — Overcoming constraints to high yield and CCS	Sept 97–Dec 00		$10,600
STU025	R McQualter — Production and evaluation of Fiji disease virus resistant transgenic sugarcane plants	Feb 98–Feb 01		$18,234

STU026	B Salter — Varietal and environmental factors predisposing to suckering in the wet tropics	Aug 98–Jul 01	$21,400
STU027	N Bower — Functional genomics of sugarcane	Mar 99–Feb 02	$29,000
STU028	S McCarthy — Automatic control of topper height	Feb 99–Feb 02	$29,000
STU032	K Nutt — Proteinase inhibitors from cane grubs	Jan 00–Dec 02	$29,000
STU033	D Ward — Strategic baiting protocols for rodents in sugar cane	Jan 00–Dec 02	$29,000

New Scholarships

STU031	New SRDC/JCU Postgraduate	Jul 00–Jun 03	$21,600
STU036	New SRDC/JCU Postgraduate	Jul 00–Jun 03	$21,600
STU037	New SRDC Postgraduate	Jan 01–Dec 03	$14,500
STU038	New SRDC Postgraduate	Jan 01–Dec 03	$14,500
STU039	New SRDC Honours	Feb 01–Dec 01	$6000
STU040	New SRDC Honours	Feb 01–Dec 01	$6000

Total Scholarships **$304,717**

ATTACHMENT B

ORGANISATIONAL IDENTIFIERS IN PROJECT CODES

Project Codes	Organisation
ARP	Australian Rural Leadership Program
BCB	Babinda Cane Protection & Productivity Board
BSS	Bureau of Sugar Experiment Stations
CE	CSIRO Entomology
CLW	CSIRO Land and Water
CSR	CSR Ltd
CSU	Charles Sturt University
CTA	CSIRO Tropical Agriculture
CVA	Climate Variability in Agriculture Program
DNR	Queensland Department of Natural Resources
DPI	Queensland Department of Primary Industries
ICB	International Consortium of Sugarcane Biotechnology
IPB	Inkerman Cane Protection & Productivity Board
JCU	James Cook University
JRA	Johnstone River Catchment Management Association
LCC	Lovett Clark Consulting
MA	Macarthur Agribusiness
MCB	Mossman Cane Protection & Productivity Board
MCM	Mossman Central Mill Company Limited
MSA	Mackay Sugar Co-operative Association Ltd
MSF	Maryborough Sugar Factory Ltd
NA	New South Wales Agriculture
NCA	National Centre for Engineering in Agriculture
NISN	National Irrigation Science Network
NSC	New South Wales Sugar Milling Cooperative Ltd
NTU	Northern Territory University
OHS	Rural R&D Corporations Farm Health & Safety Program
QUT	Queensland University of Technology
SAI	South Australian Research and Development Institute
SCU	Southern Cross University
SJF	South Johnstone Sugar Industry Task Force
SRI	Sugar Research Institute
STU	SRDC Student Scholarships
UQ	The University of Queensland
US	The University of Sydney
WAA	Agriculture Western Australia
YDV	Yield Decline Joint Venture

ATTACHMENT C

ABBREVIATIONS AND ACRONYMS

ABARE	Australian Bureau of Agricultural and Resource Economics
ACFA	Australian Cane Farmers' Association
ACGC	Australian Cane Growers' Council
AFFA	Department of Agriculture, Fisheries & Forestry Australia
AIMS	Australian Institute of Marine Science
AOP	Annual Operational Plan
ARC	Australian Research Council
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
DNA	Deoxyribonucleic Acid
DNR	Queensland Department of Natural Resources
DPI	Queensland Department of Primary Industries
EM	Extraneous Matter
ESD	Ecologically Sustainable Development
GBRMPA	Great Barrier Reef Marine Park Authority
GIS	Geographical Information System
GPS	Global Positioning System
GxE	Genotype by Environment
IPM	Integrated Pest Management
ISSCT	International Society of Sugar Cane Technologists
JCU	James Cook University
MPA	Multi-Program Activity
NIR	Near Infra-Red
PIERD Act	Primary Industries and Energy Research and Development Act (1989)
QSL	Queensland Sugar Limited
R&D	Research and Development
SRDC	Sugar Research and Development Corporation
SRI	Sugar Research Institute
UQ	The University of Queensland