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# Annual Operational Plan 2016-17

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## Sugar Research Australia Limited (SRA)

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## 1. MESSAGE FROM THE CEO

I am pleased to present Sugar Research Australia Limited's (SRA's) Annual Operational Plan for 2016/17, which sets out what we intend to do and achieve for our investors this financial year, and how we will measure and report on our performance.

SRA plans to invest \$40.5 million in Research, Development and Extension (RD&E) activities during 2016/17 to meet the objectives established under our 2013/14 – 2017/18 Strategic Plan. This Annual Operational Plan (AOP) details the RD&E projects in which SRA will invest these funds, on behalf of our industry and government investors, and the expected deliverables that will benefit the Australian sugarcane industry and community in general.

SRA's investment portfolio for 2016/17 reflects our ongoing commitment to delivering on the eight Key Focus Areas (KFAs) within our Strategic Plan and addressing the critical issues currently impacting industry productivity and profitability, specifically the four Impact Areas of: Yellow Canopy Syndrome (YCS); plant breeding (both conventional and genetically-modified (GM)); extension and adoption; and harvesting efficiency.

Our investment in 2016/17 comprises a suite of new projects that will deliver tangible outcomes on-farm and at the mill, including:

- improving our sugarcane varieties through advanced introgression techniques and selections based on plant vigour;
- improving industry productivity through the analysis of industry data and demonstration of best practices;
- addressing new chemical approaches for canegrub control;
- reducing sugarcane mill boiler maintenance costs and deferring capital expenditure through improved technology;
- improving identification methods for exotic moth borers and soil-borne pathogens; and
- developing a remote sensing platform to assist with yield forecasting and nitrogen management.

We will be seeking to enhance our impact by strengthening our linkages and collaboration with other rural Research and Development Corporations (RDCs) and research providers, both in Australia and internationally, as well as leveraging partnerships with industry service providers, government agencies and the private sector.

In doing so, we will focus our collaborative efforts on research activities that will deliver real benefits on key issues for our investors. These key issues include: varietal improvement, which is repeatedly identified by our industry investors as their highest research priority; on-farm productivity improvement, including adoption of precision agriculture and harvesting best practices and technology; biosecurity; and soil health and nutrient management improvement, including minimising off-farm effects on water quality.

We will utilise and build-on our partnerships and variety exchange programs with our international peers in over 15 countries.

We will partner with other RDCs on a number of ongoing cross-sectoral research projects and new collaborative initiatives, including significant projects under the Commonwealth Government's Rural Research and Development (R&D) for Profit Programme, such as the \$5.5 million *Harvest losses* and \$5.8 million *More profit from less nitrogen* projects announced in round two of the Programme. This is in addition to the \$4.6 million *Biorefinery* project that was funded in round one last year.

We will continue to strengthen our strategic alliance with the Queensland and Commonwealth Governments and support a proactive and science-based approach to researching nitrogen use in the Australian sugarcane industry, with a particular focus on: optimising nutrient use; maintaining soil fertility; and minimising off-farm effects on water quality, particularly in the Great Barrier Reef catchment areas. In doing so, SRA will continue to assist industry investors to optimise

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productivity and profitability through the use of SIX EASY STEPS™ nutrient management guidelines, whilst also moving towards meeting government water quality targets.

We will continue to be fully accountable to our investors through regular open and transparent communication of our performance and progress against the objectives and deliverables in this AOP. Our performance will be reported through our corporate publications, including regular electronic newsletters, quarterly editions of *CaneConnection*, SRA's 2015/16 Performance Report and our 2015/16 Annual Report.

Our performance will also be under the spotlight with the undertaking of SRA's first three-yearly Independent Performance Review, which is a requirement of SRA's Constitution and Statutory Funding Agreement with the Commonwealth Government. The review findings and recommendations will be published in late 2016, along with SRA's response and implementation plan to address the review's recommendations.

With the completion of our inaugural performance review, we will review and refresh SRA's strategic direction. In doing so, we plan to engage closely with our investors, members, Delegates, industry representative bodies, research and extension providers, and other industry stakeholders on shaping our next five-year Strategic Plan. A series of consultation and engagement activities will be undertaken from late 2016 through to early 2017, to review investor priorities and set the strategic RD&E agenda for SRA for the coming years. An Engagement and Consultation Plan will be released in October 2016 outlining the strategic planning engagement program and timelines.

We will improve the way that we operate, listen and respond to the feedback we receive from our industry and government investors. We will also continue to keep pace with the issues and concerns of our investors through regular consultation with SRA's Delegates, industry representative bodies and government investor representatives. In particular, we will work to enhance our relationship and interactions with SRA's Delegates, not just through written communications and convening of Delegates' meetings but also through proactive engagement and information exchange with SRA's Adoption Officers.

SRA's Board, researchers and support staff remain committed to delivering positive impacts for our investors. To ensure the company is best positioned to do so, we have endeavoured over the last 18 months to fully align our organisational structure, financial, operational and performance management frameworks with the KFAs outlined in this plan. During 2016/17, we will further enhance this alignment and optimise our organisational performance by undertaking the following initiatives:

- succession and development planning for key research and leadership positions;
- continued implementation of performance and values-based culture development programs;
- internal audit reviews covering financial stewardship (budgeting, forecasting and performance monitoring processes and controls), core IT processes and research data management processes and controls; and
- establishment of an integrated Intellectual Property management system.

It will be another busy year for SRA. We look forward to working with our investors, Delegates, research partners and industry stakeholders to effectively deliver our RD&E portfolio and achieve valued return on investment and outcomes that improve the productivity, profitability and sustainability of the Australian sugarcane industry.



**Neil Fisher**  
Chief Executive Officer

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## 2. SRA OPERATIONS

### 2.1. Introduction

SRA is an Industry Owned Company (IOC) that invests in and manages a portfolio of research, development and adoption projects that drive productivity, profitability and sustainability for the Australian sugarcane industry.

As the declared Industry Services Body for the Australian sugarcane industry under the *Sugar Research and Development Services Act 2013* (Cth), SRA is responsible for directly undertaking research, development and adoption activities as well as managing and investing the funds received from industry levy payers and government, for the benefit of the sugarcane industry and for the wider community.

The core responsibilities of SRA are to:

- Deliver cost-effective R&D services to the Australian sugarcane industry to enhance its viability, competitiveness and sustainability;
- Carry-out, coordinate and provide funding for R&D activities in relation to the Australian sugarcane industry;
- Facilitate the dissemination, extension, adoption and commercialisation of results of R&D activities; and
- Support and develop industry research and extension capacity.

In doing so, SRA is both an investor in and provider of RD&E activities for the Australian sugarcane industry. In addition to facilitating and investing in targeted RD&E projects that address industry priorities, SRA has its own team of researchers and Adoption Officers who carry out core work which aims to build the capacity and sustainability of the industry. They also provide analytical, operational and adoption support to our multi-disciplinary teams and collaborative research, development and adoption projects.

SRA's main sources of funds, to support both SRA's core activities and investment in RD&E projects, come from a statutory levy paid by sugarcane growers and millers (\$23.1 million in 2016/17), Statutory Funding Agreement payments<sup>1</sup> from the Commonwealth Government (\$5.7 million in 2016/17) and investments from the Queensland Government (\$2.85 million from the Department of Agriculture and Fisheries and \$0.8 million from the Department of Environment and Heritage Protection in 2016/17). The sugarcane industry levy is calculated on the basis of 70 cents per tonne of sugarcane processed or sold for processing. This levy is shared equally between growers and millers (35 cents per tonne each). SRA also receives minor income from other sources, such as interest, royalties for the use of intellectual property and payments for the provision of SRA services (e.g. scientific testing and analysis).

With respect to managing and investing funds from levy payers and government investors, SRA has established a strategic management and planning framework that includes the development and delivery of a five-year Strategic Plan and AOPs for each year covered by the Strategic Plan.

This AOP outlines the direction and resourcing for SRA's core activities and investments in RD&E projects (both as an investor and as a provider) to be undertaken during 2016/17, to deliver on SRA's 2013/14 – 2017/18 Strategic Plan. This AOP should be read in conjunction with the Strategic Plan.

In delivering on this AOP, SRA will continue to collaborate with its members, levy payers, industry representative bodies, government, productivity services, extension providers, other industry stakeholders, researchers and international peers and partners. SRA also intends to leverage synergies and opportunities with other IOCs and RDCs to address cross-sectoral issues impacting agricultural industries, and identify and improve access to leading-edge innovation, best-practice and technological advancements.

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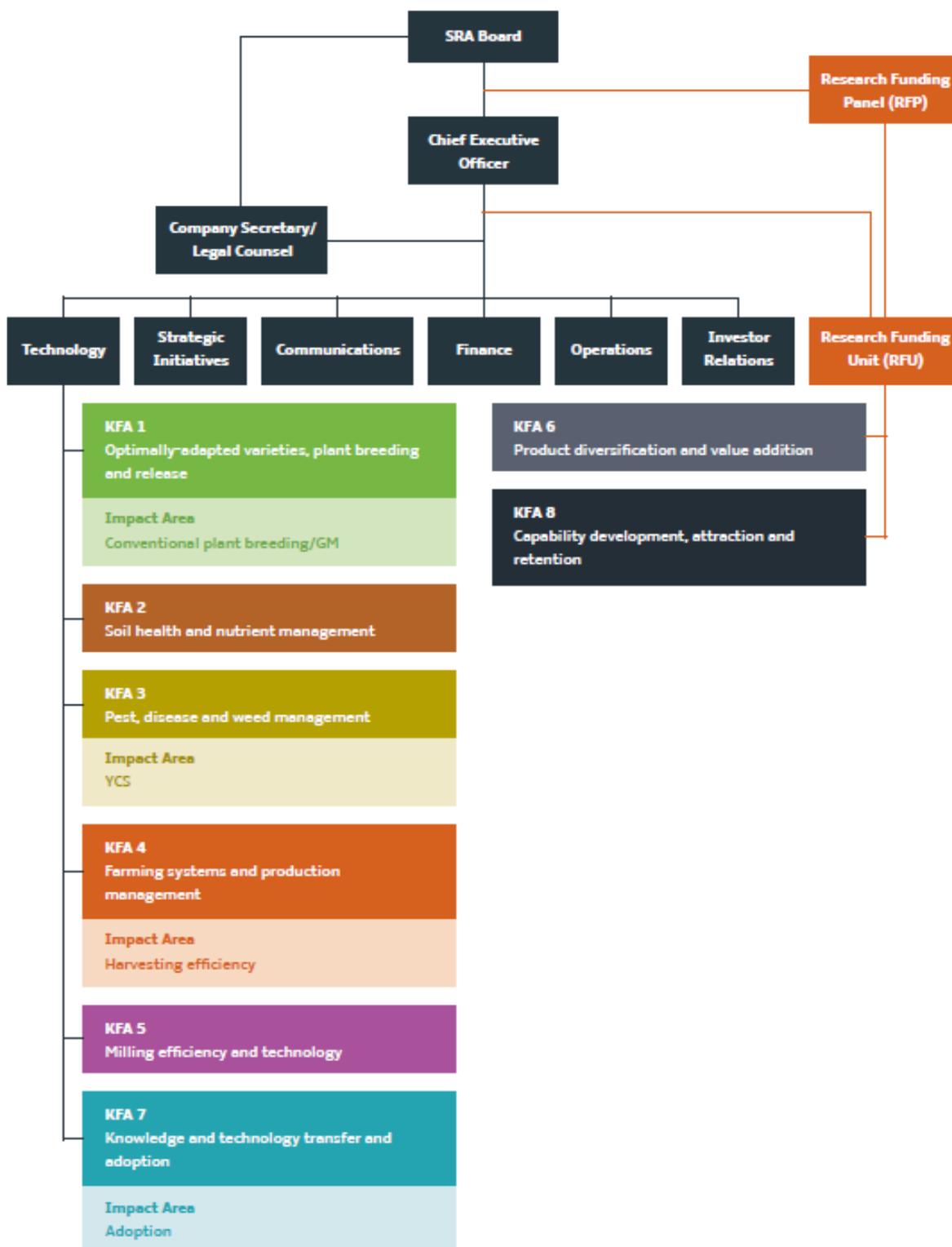
<sup>1</sup> Statutory Funding Agreement 2013-2017 between SRA and the Commonwealth Government, administered by the Department of Agriculture and Water Resources.

## 2.2. Organisational Structure

SRA has approximately 160 staff that operate across the business in a range of roles that support and drive RD&E for the Australian sugarcane industry. SRA operates research farms, laboratories and offices across Australia’s sugarcane growing regions of New South Wales and Queensland, with facilities located in Broadwater, Indooroopilly, Woodford, Bundaberg, Burdekin, Ingham, Tully and Meringa.

As shown in Figure 1, SRA has recently re-shaped its organisational structure to align with and support the delivery of the strategic objectives that underpin the 2013/14 - 2017/18 Strategic Plan and this AOP.

**Figure 1: SRA’s Organisational Structure**



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By aligning our organisational structure with our KFAs and the four Impact Areas identified by the SRA Board as requiring priority investment, we have eliminated the silo structure that previously existed around “research” and “development” functions, and are now far better positioned to deliver RD&E outputs that will lead to beneficial outcomes for our investors.

A new Strategic Initiatives division has been established to: drive strategic alliances, including collaboration with other research bodies; champion YCS research; mentor our young scientists; and manage SRA’s internal contestable research project proposals process. The new structure also eliminates the confusion of having these strategic initiatives previously managed under both our old “research” and “development” divisions. The new structure reinforces that development, technology transfer and adoption are a vital part of the research process and should be embedded alongside the research, rather than in separate divisions.

SRA’s business model also ensures the investor functions of SRA are appropriately sectioned-off from the research provider functions, thereby ensuring unbiased project assessment and recommendation, as well as transparency and accountability in RD&E investment allocation and management.

### 2.3. Collaboration and Co-investment

SRA recognises the importance of working with industry, research partners and collaborators, government and other organisations to leverage synergies and enhance capability. SRA currently works in partnership with leading Australian organisations such as the Commonwealth Scientific and Industrial Research Organisation (CSIRO), universities, government and other industry groups such as regional productivity services, growers, millers, harvesting contractors and manufacturers, and natural resource management companies. We also partner with the private sector (both within Australia and internationally) and international sugarcane research organisations to create collaborative opportunities and capability enhancement for the benefit of the Australian sugarcane industry.

SRA also undertakes cross-sector collaboration and investment with other IOCs and RDCs to develop or conduct collaborative RD&E that will benefit the Australian sugarcane industry and the broader Australian community.

SRA currently invests in and collaborates on cross-sectoral R&D in the following strategy areas:

- Biofuels and bioenergy;
- Climate change and managing climate variation;
- Water use in agriculture;
- Plant biosecurity;
- Precision Agriculture (Research and Innovation Network for Precision Agriculture Systems); and
- Soils.

SRA is also leading and/or partnering with a number of IOCs and RDCs on a suite of research projects under the Australian Government’s Rural R&D for Profit Programme. These collaborative projects provide significant leverage for SRA’s investment for the benefit of our investors and broader stakeholders. The projects include:

- Bio-refineries for higher-value animal feed, chemicals and fuel;
- Improved use of seasonal forecasting to increase farmer profitability;
- Novel fertilisers and feeds;
- Smarter irrigation for profit;
- Stimulating private sector extension in Australian agriculture;
- Consolidating targeted and practical extension services;
- Harvest losses;
- Accelerating precision agriculture to decision agriculture; and

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- More profit from less nitrogen: enhancing nitrogen-use efficiency of intensive cropping and pasture systems.

In addition to participation in cross-sectoral research, SRA will continue to pursue strategic partnerships and collaborate with other researchers and international peers on advanced technologies and agricultural practices, where appropriate and beneficial to the Australian sugarcane industry. Establishing partnerships with leading international sugarcane breeding and research institutions is a critical aspect of continuing to improve the Australian sugarcane variety development program, on-farm practices and technology, and milling processing and efficiency.

SRA currently has strong collaborative partnerships and variety exchange programs with over 15 countries, including China, Thailand, Vietnam, Papua New Guinea and Indonesia.

SRA also recently entered into a new research partnership with India's Sugarcane Breeding Institute to conduct joint research to help accelerate gains in sugarcane breeding and variety development. With the assistance of the Commonwealth Government's bilateral Australia-India Strategic Research Fund, the project will seek to identify genetic markers for cane yield, sugar content, drought tolerance and red rot resistance in sugarcane varieties, using sophisticated biotechnology. The project builds on previous investment made by the Australian sugarcane industry in developing this technology jointly by SRA, CSIRO and Syngenta. The results will be used to determine ways to accelerate gains in sugarcane breeding, as well as providing a foundation for mutually beneficial cooperation for sugarcane improvement.

SRA recognises the importance of leveraging resources and synergies through partnerships and collaborations to address issues that are of significant economic, environmental and social concern, not just to the Australian sugarcane industry but for the broader public good. For example, SRA will continue to strengthen its strategic alliance with the Queensland Government to leverage our research into nitrogen use and best practice nutrient management to deliver economically viable improvements in productivity and environmental sustainability, particularly in relation to moving towards meeting water quality targets in the Great Barrier Reef catchment areas.

## 2.4. Balanced Portfolio

SRA is committed to ensuring it invests, manages and participates in a balanced portfolio of research, development and adoption activities that is appropriate to meeting the industry's needs and providing an attractive return on investment.

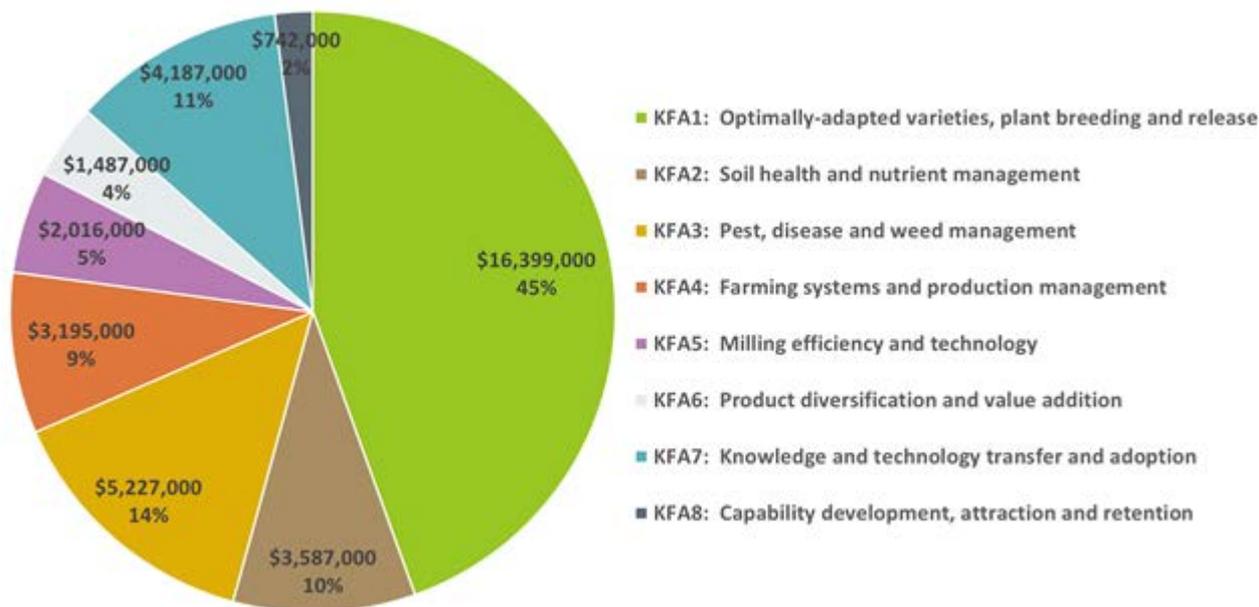
SRA's independent skills-based Research Funding Panel (RFP) and Research Funding Unit manage the contestable research investment process and associated review and evaluation of funded projects. The primary objective of the RFP is to ensure transparent, independent and robust review of all research, development and adoption projects to be funded from SRA's contestable pool of industry and government investment funds. In this way, all projects are selected for investment based on merit, but also against industry and government priorities. That is, the RFP selects projects where the best research outcome can be achieved from the range of possible investments presented to it.

In delivering a balanced portfolio of RD&E activity, the RFP undertakes to:

- Identify short, medium and longer-term projects for funding on merit against industry priorities, government priorities and the KFAs in SRA's Strategic Plan;
- Address current gaps in the existing research portfolio;
- Increase industry return on SRA's research investment;
- Focus on industry benefit and the adoption of research outputs;
- Foster high-quality, relevant research which delivers benefits across multiple timeframes;
- Provide competitive, independent, unbiased investment assessment; and
- Increase industry participation in research, development and adoption activities.

Figure 2 details the portfolio balance and investment in SRA's KFAs in 2016/17. Reflective of investor expectations with respect to investment allocations, and in line with SRA's Strategic Plan, the majority of the investment currently lies within the areas of: variety development and plant breeding; pest and disease control; on-farm production; and adoption.

**Figure 2: Key Focus Area Expenditure 2016/17**



To further ensure SRA delivers a balanced RD&E investment portfolio, SRA will be undertaking an exercise in 2016/17 to classify all projects in our portfolio in terms of their position on the research pipeline. The classifications will enable SRA to better track research outputs and products along the pipeline and better inform SRA's investment processes with respect to further investment(s) that may be required along the pipeline to ensure impacts can be realised on-farm and at the mill.

## 2.5. Performance Monitoring and Evaluation

SRA operates through an annual cycle of planning and accountability at all levels in the organisation. The cycle includes interlocking processes of strategic and operational planning, budgeting, implementation, evaluation, performance review and accountability to our members, levy payers and government investors.

During 2016/17, SRA will continue to embed its Monitoring and Evaluation (M&E) Framework that enables SRA to clearly demonstrate valued return on investment through:

- Monitoring and assessment of the progress and outcome of SRA's core activities and investment projects, using an output-outcome-impact framework; and
- Reporting to our Board and investors on the performance of our RD&E portfolio and the benefits delivered to both the industry and broader communities.

The primary monitoring and reporting mechanisms include:

- Regular traffic light reporting to the Board on output delivery and achievement against KPIs;
- Six-monthly exception reporting to the SRA Board on progress against the Strategic Plan; and
- Annual Performance Report published to demonstrate the performance of SRA's RD&E activities and the return on investment provided to SRA's industry and government investors.

The Audit and Risk Committee of the SRA Board will also review, on an ongoing basis, a suite of reports that cover SRA's operational and strategic performance. The suite of performance reports

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considered by the Audit and Risk Committee include: SRA operational reports, such as Finance, Workplace Health and Safety and Risk Management; and Research Funding Unit (RFU) reports on the investment project portfolio. Where required, the Audit and Risk Committee will provide the Board with recommendations for remedial action to be taken to ensure SRA's operational and strategic performance remains on-track.

As prescribed under both SRA's Constitution and the Statutory Funding Agreement (SFA) 2013-2017 with the Commonwealth Government, SRA is required to engage an independent organisation to undertake a comprehensive review of performance since SRA's establishment in 2013. This Independent Performance Review commenced in late 2015/16 and is focused on reviewing SRA's performance against the provisions of the SFA and the extent to which the company is delivering benefits to its investors. The review includes consideration of SRA's role as both a research funder and research provider and an assessment of SRA's corporate governance; operations; planning, monitoring, evaluation and reporting; and interaction with investors and broader stakeholders.

The review will be completed in late 2016 with the review findings and recommendations being published in a report. SRA will shortly thereafter publish the SRA Board's response to the review findings and an implementation plan to address the recommendations in the report. Both the report and SRA's response will also be presented to a meeting of SRA's Delegates.

SRA will also regularly communicate with our investors and other stakeholders on our strategic and operational performance and use feedback on our performance to continually improve the quality of our research and investment processes, programs and activities.

### 3. STRATEGIC FRAMEWORK

#### 3.1. RD&E Priorities

The ethos that underpins both SRA's Strategic Plan and this AOP is one that is outcome and investor focused, consultative and collaborative. SRA is committed to listening to our investors, understanding their needs and responding to these needs through innovative R&D solutions that are successfully adopted and deliver significant value for the industry as-a-whole, as well as benefits for the broader Australian community.

SRA's 2013/14 - 2017/18 Strategic Plan, and the associated KFAs that underpin the Strategic Plan and this AOP, respond to the priority issues of the sugarcane industry and, more broadly, the priorities of the agricultural sector, government and the wider Australian public. More specifically, the KFAs respond to the issues raised during consultation with industry, government and researchers, as well as the principles, strategies and priorities set out in the following strategic documents:

- *Statement on Priorities for Research 2011 - 2014*, Australian Sugar Industry Alliance, 2011;
- *National Primary Industries RD&E Framework and Guidelines*, Australian Government;
- *National Sugarcane Industry RD&E Strategy*, 2010;
- *National Science and Research Priorities*, Australian Government, 2015;
- *Rural Research and Development Priorities*, Australian Government, 2015; and
- *Queensland's Food and Fibre Policy - Labor's Plan for Agriculture*<sup>2</sup>, Queensland Labor Party, 2015.

There is strong alignment across the priorities of the industry, Queensland Government, Commonwealth Government and SRA, particularly with respect to: productivity; industry and environmental sustainability; emerging technology; diversified product opportunities; technology transfer; best management practices; and enhancing scientific capacity. A matrix detailing the alignment between the key industry and government priorities and SRA's KFAs for investment is provided in Attachment 1.

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<sup>2</sup> The Queensland Government is currently developing a ten-year agriculture and food RD&E 'Blueprint' and supporting 'Roadmaps' which will augment the objectives in *Food and Fibre - Labor's Plan for Agriculture*.

In responding to the industry and government priorities, SRA has embedded the priorities in all aspects of its RD&E investor and research provider activities, including: determining the direction of a project call; forming the primary criteria for investment decisions; and providing focus areas for measuring SRA's performance and delivery of valued return on investment. Table 1 details SRA's estimated total investment for 2016/17 allocated against each of the Commonwealth Government's National Science and Research Priorities and the Rural RD&E Priorities.

**Table1: SRA's RD&E investment estimates 2016/17 across Commonwealth Government Priorities**

Stakeholder Priorities	Total Investment 2016/17	
	(\$k)	%
<b><i>National Science and Research Priorities<sup>3</sup></i></b>		
1. Food	23,484	55%
2. Soil and water	3,757	9%
3. Transport	652	2%
4. Cybersecurity	-	-
5. Energy	442	1%
6. Resources	-	-
7. Advanced manufacturing	1,514	4%
8. Environmental change	2,365	5%
9. Health	-	-
<i>Other*</i>	10,837	25%
<b>Total</b>	<b>43,050</b>	<b>100%</b>
<b><i>Rural RD&amp;E Priorities<sup>4</sup></i></b>		
1. Advanced technology	14,642	34%
2. Biosecurity	8,402	20%
3. Soil, water and managing natural resources	7,645	18%
4. Adoption of R&D	4,567	11%
<i>Other*</i>	7,794	18%
<b>Total</b>	<b>43,050</b>	<b>100%</b>

To ensure SRA continues to meet investor priorities and expectations, SRA consults regularly with industry representative bodies and government representatives. These consultations include scheduled formal meetings to discuss: RD&E priorities; SRA's investment and research activities; SRA's performance and returns to investors; statutory reporting; levy arrangements; and other matters of mutual interest.

SRA will report on our contribution and achievements against these priorities in our 2016/17 Annual Report.

<sup>3</sup> *National Science and Research Priorities*, Australian Government, 2015.

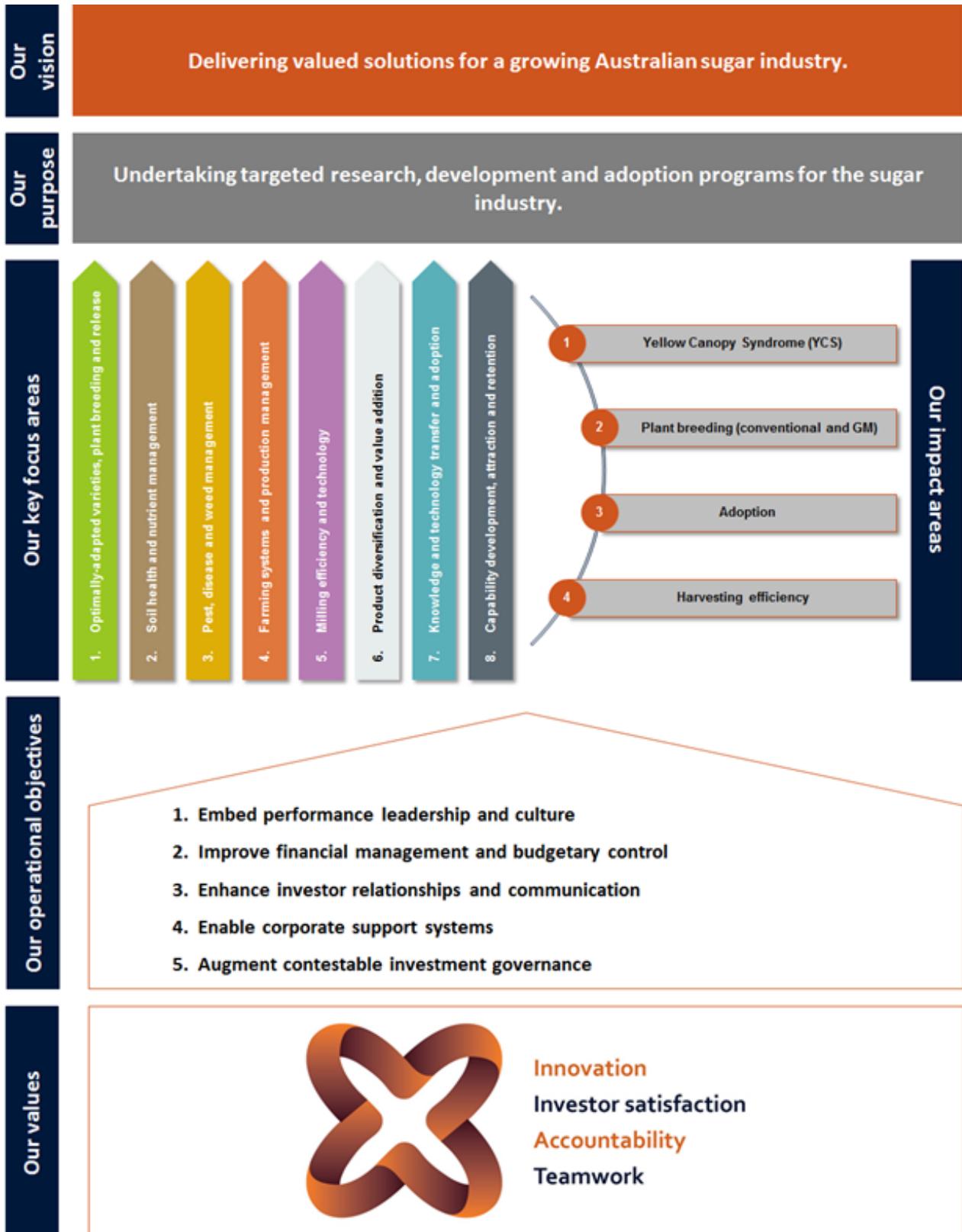
<sup>4</sup> *Rural RD&E Priorities*, Agricultural Competitiveness White Paper, Australian Government, 2015.

\* Other includes unallocated research, R&D management and corporate support.

### 3.2. Vision, Purpose and Key Focus Areas

SRA’s vision, purpose and KFAs established to address the primary productivity, profitability and sustainability challenges and opportunities facing SRA’s industry investors (Australia’s sugarcane growers and millers) and of significance to SRA’s government investors (the Commonwealth and Queensland Governments) are shown in Figure 3.

Figure 3: SRA’s strategic framework for delivering valued sugarcane RD&E



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### 3.3. Impact Areas

A number of issues and challenges that fall within the KFAs were identified by the SRA Board in 2015/16 as requiring more immediate attention and/or greater investment. These issues continue to have a significant negative impact on industry and/or present significant opportunities to improve industry productivity and profitability. In response, SRA will continue during 2016/17 to target RD&E activity and investment towards the following high-priority issues or 'Impact Areas':

- Yellow Canopy Syndrome (YCS);
- Plant breeding (conventional and GM);
- Extension and adoption; and
- Harvesting efficiency.

#### 3.3.1. Yellow Canopy Syndrome

YCS is a condition of unknown cause that is currently affecting sugarcane crops in Queensland. Since YCS was first recognised in early 2012 near Cairns, it has now been found in all sugarcane growing areas from Maryborough in the south to far north Queensland. Depending on the degree of YCS symptoms experienced, crop growth can be compromised with potential impacts on final yields. Whilst it is difficult at this stage to accurately estimate the financial impact YCS has had on the industry to-date, it is acknowledged that significant losses have been experienced in some impacted areas.

In response to the threat that YCS poses to the industry, SRA (with co-investment from the Queensland Department of Agriculture and Fisheries) has established four substantial research projects since 2014/15. In response to recommendations from an international expert panel in November 2015, a fifth project aimed at potential biotic factors will be initiated in 2016/17. A number of abiotic factors (water, macro and micronutrients, soil type, heavy metals and some agrochemicals) and biotic factors (known sugarcane pests and diseases, *Nigrospora* sp., crop age and seed source) have been ruled out as potential causes of YCS. We now know that YCS is associated with a problem in translocation of sugars out of the leaf and water movement within the sugarcane plant. In combination, these factors reduce photosynthesis, movement of photosynthate and crop performance.

With YCS expanding in its geographical distribution and the subsequent impact the condition is having on crop yield, SRA is continuing to give YCS related research an extremely high priority in 2016/17. There will be a strong emphasis on water and nutrient translocation, development of a diagnostic test, identification of the causal agent of YCS, genetic variability for YCS impact, abiotic/environmental factors that trigger symptom expression, and potential management strategies.

#### 3.3.2. Plant Breeding (Conventional and GM)

Varieties are the cornerstone of productivity and profitability in the Australian sugarcane industry. Virtually every crop grown by Australian sugarcane farmers uses varieties released from the SRA breeding program.

SRA's breeding program is recognised as world-class and is successfully delivering genetic gain and value to the industry. However, sugarcane growers and millers continue to have high expectations that sugarcane varieties will deliver better ratoonnability and productivity (tonnes of cane per hectare (TCH), commercial cane sugar (CCS) and tonnes of sugar per hectare (TSH)).

The SRA breeding program continues to address grower and miller expectations through the delivery of new varieties to the industry. Based on its target, at least 3 new varieties are released every 5 years. In 2016, the Variety Approval Committees decided to release five new varieties, SRA4 to SRA8. Behind the scenes of the core breeding program are activities to broaden the genetic base of sugarcane by germplasm exchanges with international partners, and introgression from wild species. The potential benefits of exploiting foreign germplasm in the SRA breeding program include improvements in key traits such as yield and new sources of useful genes (e.g. disease and pest resistance).

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Important activity in 2016/17 will include an internal review of SRA's breeding program and a new breeding plan to focus on implementing molecular markers will be developed in 2016. Molecular breeding systems have provided dramatic improvements in efficiency and effectiveness in other crops species, and show promise in sugarcane based on preliminary results. Key collaborations will include the University of Queensland for quantitative genetics and CSIRO for high-throughput marker platforms and genomics.

Plant-breeding activities are closely linked to trait research, which will continue in key areas of water-use efficiency (WUE) and nitrogen-use efficiency (NUE). A project involving selection for WUE traits at the early stage of the breeding selection process will begin in 2016. For NUE, further research will be conducted on identifying key NUE traits, testing for genetic variation for nitrogen uptake, and evaluation of screening methods or tools for measuring NUE traits. Key collaborations will include CSIRO, University of Queensland, the University of New England and the Indian Sugarcane Breeding Institute.

Whilst SRA's conventional breeding program optimises selection using sugarcane and its close relatives, SRA's GM program is focussed on broadening the genetic base through the introduction of herbicide-tolerant (HT) traits and the development of high-sucrose sugarcane.

With yield loss attributed to weeds being as high as 13-15% in the Australian sugarcane industry, SRA has been developing, in collaboration with DuPont, GM HT sugarcane varieties. The current main activities in the GM program involve field evaluation including agronomy, disease and yield evaluation trials at multiple locations, with the majority of HT clones demonstrating high herbicide tolerance. Field assessment and further development of high-sucrose GM sugarcane is also ongoing involving field selection of transgenic clones.

### **3.3.3. Extension and Adoption**

Fundamental to obtaining the full value from SRA's investment in R&D is the broad adoption of the outcomes of this research. Current indications suggest that the rate and extent of adoption of new technologies and practice change are sub-optimal in the Australian sugarcane industry.

A number of factors contribute to this situation, including: variable resourcing and capabilities across the industry's productivity services and broader extension sectors; low profitability; varying capacity and/or interest of growers to adopt new technology; and limited direct interaction between SRA and potential adopters.

To address these issues, SRA is working with industry to review the current extension model with a view to enhancing the transfer of research information and facilitating improved interactions and connections with industry extension providers, in particular productivity services.

During 2016/17, SRA will continue to work with industry to enhance the role of SRA's Adoption Officers. The current adoption model is under review and an industry consultation paper will be presented to regional industry in mid-2016 for discussion and agreement. Under the proposed model, the Adoption team will focus on two aspects: firstly, development and transfer of information; and secondly, facilitation of adoption at regional levels.

SRA will actively seek and create opportunities to engage with our members, Delegates, levy payers and industry stakeholders, including productivity services and private extension providers, to both listen to them and learn what they require in terms of technologies and practice change to drive profitability and productivity.

In collaboration with industry and researchers, we will continue to augment our regionally-based activities and enhance interactions and the two-way flow of information between all parties, through the provision of: grower and industry updates; on-farm and field-based demonstrations; and industry events aimed at showcasing new technologies.

The significant outcomes from this activity will include: an enhancement of SRA's capacity to identify on-ground priorities; an ability for SRA to be more responsive to industry needs; and mechanisms to raise awareness of SRA's RD&E activities and new technologies.

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In addition, SRA plans to work with early adopters and innovators within the sugarcane industry to assist in the development of grower-derived innovation, identify learnings from the on-farm experience of this group and promote their innovations to the broader industry. SRA will also be seeking to understand the drivers of adoption and practice change for individual growers and millers so that we can better tailor our adoption and extension facilitation programs. To this end, we will undertake our annual grower survey to track adoption and practice change over time and across the industry.

### 3.3.4. Harvesting Efficiency

Sugarcane production and profitability are affected by both harvesting and field issues. Research has demonstrated that mechanical harvesting typically results in direct in-field losses which include:

- Extractor losses of 5 – 25%;
- Pick-up losses of 1 – 10%; and
- Chopper losses of 2 – 8%.

Field conditions impact on extraneous matter (EM) and cane loss, crop presentation (row profile/width) impacts on stool damage and pickup losses, fan speed determines cane loss levels with limited impact on EM and lower pour rates equals lower EM, but this increases harvesting costs. High ground speeds and poor crop presentation/row profiles also result in stool damage that reduces yields in subsequent ratoons.

Cane cleaning greatly improves at lower pour rates, which are achieved by reducing ground speed. The lower ground speed allows a reduction in fan speed, which in turn lowers cane loss, stool damage and soil in cane, but significantly increases the cost of harvesting. High quality cane will have a higher CCS, improving grower returns.

However, economic pressures on the harvesting sector drive practices that minimise costs rather than maximise sugar recovery. This then feeds through to the decisions harvester operators have to make to be viable under this scenario:

- Harvesting speed;
- Billet length;
- Fan speed; and
- Haulout size etc.

To address this issue, a payment system that accounts for the extra cost to implement Harvesting Best Outcomes (HBO) is one way to encourage uptake. The benefits provided by HBO will flow to all sectors of the industry, in particular growers and millers through increased yields (due to reduced losses), increased CCS and improved ratoonability.

With harvesting impacting on raw sugar quality and crop yields, a broader adoption of HBO is an industry priority as it will contribute significantly to the ongoing profitability and sustainability of the entire sugarcane industry value chain. In an effort to increase the rate of adoption of HBO, SRA will focus in 2016/17 on increasing current on-farm applied HBO research activities and working with industry to establish additional regional trials to demonstrate the value of harvesting practice change.

A broad range of research activities will be conducted within the \$5.5 million Rural Research and Development for Profit project on harvesting efficiency. Some specific tasks will include: testing and validating physical cane cleaning systems; modifications to harvesters to improve in-field performance; value chain modelling and economic analysis; software tools to improve and block specific harvesting practices; and extensive trial work to confirm industry opinions. In undertaking these activities, SRA will continue to partner with Wilmar Sugar Australia Limited, MSF Sugar Limited, Isis Central Sugar Milling Company Limited, Bundaberg Sugar Limited, Tully Sugar Limited and Sunshine Sugar Limited.

### 3.4. Key Performance Indicators

At the organisational level, the Key Performance Indicators (KPIs) detailed in Table 2 will be used by SRA to measure and report on performance against our strategic and operational objectives.

**Table 2: SRA's Key Performance Indicators**

KEY PERFORMANCE INDICATORS		TARGETS
SRA/KPI1	Alignment of RD&E investment portfolio with investor priorities.	Endorsement of Strategic Plan and Annual Operational Plans by Commonwealth Government; executed funding agreement with the Queensland Department of Agriculture and Fisheries (DAF); and endorsement of Strategic Plan by industry representative bodies.
SRA/KPI2	Economic returns from RD&E investments.	Aggregated Benefit-Cost Ratio of 4:1, as measured through annual independent evaluations of a selection of projects/programs in SRA's RD&E portfolio.
SRA/KPI3	SRA performance rating.	Increase from 66% 'high' to 70% 'high', as measured in the SRA Grower survey.
SRA/KPI4	Compliance with statutory obligations and requirements.	100% compliance.

In addition, SRA will also monitor and report against a suite of KPIs within each of the KFAs, as detailed in Section 5.

## 4. KFA OBJECTIVES, OUTPUTS, OUTCOMES, KPIs AND PROJECTS

### KFA1: Optimally-adapted varieties, plant breeding and release

OBJECTIVES	
KFA1/OBJ1	To deliver a world-class variety development program that produces varieties that: <ul style="list-style-type: none"> <li>• provide increased cane and sugar yields; and/or</li> <li>• are more tolerant of adverse climatic conditions (drought, frost, etc.); and/or</li> <li>• are more resistant to pests and diseases; and /or</li> <li>• require reduced inputs (nutrients, water, etc.); and/or</li> <li>• provide improved ratoonability.</li> </ul>
KFA1/OBJ2	To enhance the variety breeding, selection and release program through: <ul style="list-style-type: none"> <li>• increased collaboration with growers, millers and productivity services groups; and</li> <li>• increased regional commercial sized trials and regional releases; and</li> <li>• earlier communication and dissemination of appropriate variety trait and performance information.</li> </ul>

OUTPUTS for 2016/17	
KFA1/DEL1	Industry provided with data on a suite of potential new varieties that allows regional Variety Adoption Committees to decide which varieties will be released for commercial production in each region.
KFA1/DEL2	Clean 'seed' provided to Australian sugarcane industry tissue-culture companies and distribution agencies.
KFA1/DEL3	Plant Breeder's Rights (PBR) secured for new commercial varieties.
KFA1/DEL4	Updated strategy for selecting seedlings in stage 1 trials and cost-benefit analysis of new methods of selection.
KFA1/DEL5	Zonal field selection, mapping and trials to improve genetic gains from selection.
KFA1/DEL6	New germplasm with superior yield, frost tolerance and resistance to <i>Pachymetra</i> and nematodes.
KFA1/DEL7	Single Nucleotide Polymorphism (SNP) marker development including identification of SNP chips containing 48,000 SNPs and genomic breeding values estimated by SNPs for 1,850 clones.
KFA1/DEL8	Diagnostic set of <i>Erianthus</i> and <i>S. spontaneum</i> primers to select <i>Erianthus</i> chromosomes and facilitate the screening of new introgressed hybrids.
KFA1/DEL9	Introduction of Chinese sugarcane germplasm with the potential to improve water use efficiency into Australian trait development program.
KFA1/DEL10	New introgression population generated by crossing Indonesian- <i>Erianthus</i> and Chinese derived hybrids.
KFA1/DEL11	Protocols for cell-cycle synchronisation and flow sorting methods established for the selection of high-value chromosomes from wild introgression material.

OUTPUTS for 2016/17	
KFA1/DEL12	Heritability of transpiration efficiency trait tested in the breeding program.
KFA1/DEL13	Approximately 600 new introgression clones selected from seedlings to go to the next stage of selection.
KFA1/DEL14	Quantitative data on the inheritance of canopy temperature and crop vigour in sugarcane.
KFA1/DEL15	Quantitative analysis of mill data for the identification of factors affecting productivity in the Burdekin, Tully and South Johnstone mill areas.
KFA1/DEL16	Screening of above-ground growth and nitrogen-use efficiency linked physiological traits in sugarcane.
KFA1/DEL17	Resistance ratings for <i>Pachymetra</i> root rot for new varieties and ratings for orange rust and yellow spot resistance for elite parents.
KFA1/DEL18	Mapping of disease resistance genes and validation of disease SNP markers.
KFA1/DEL19	Screening of approximately 2,500 clones from various stages of selection program for smut, Fiji gall, mosaic, leaf scald, red rot and nematodes.
KFA1/DEL20	Identification of best high-throughput platform for effective use within the sugarcane marker program.
KFA1/DEL21	Healthy sugarcane root system description completed and glasshouse trial on root traits commenced.
KFA1/DEL22	Experimental technique to study sugarcane shoot architecture validated.
KFA1/DEL23	Elite commercially-useful GM HT clones identified and deregulation dossier completed.
KFA1/DEL24	Analysis of plant and ratoon crop data for high-sucrose GM sugarcane lines.

OUTCOMES	
KFA1/OUT1	Comprehensive and efficient variety breeding, selection and release programs responding to yield expectations, environmental constraints, resource scarcity and regional preferences.
KFA1/OUT2	Faster varietal adoption using advanced methods for bulking, distribution and planting.

KEY PERFORMANCE INDICATORS		TARGETS
KFA1/KPI1	Release of improved varieties.	3 new varieties which meet expectations released per 5-year period for each region.
KFA1/KPI2	Percent production from new varieties.	Increasing.
KFA1/KPI3	Rate of genetic gain (TCH, CCS, TSH).	Continue to increase.
KFA1/KPI4	Weighted average disease ratings for varieties in each region.	Resistance levels continue to increase.
KFA1/KPI5	PBR secured for new commercial varieties.	All new varieties will be PBR protected.

PROJECTS			
Project No.	Description	Project Type <sup>5</sup>	2016/17 \$k
2008801	Herbicide resistant sugarcane.	CRP	1,712
2009800	Deregulation of GM traits.	CRP	264
2010002	Australian support of the International Consortium for Sugarcane Biotechnology.	CRP	5
2011343	Maximising genetic gain from family and within family selection.	C SRA	197
2012351	Improving the accuracy of selection in sugarcane breeding trials through accounting for site variability.	C SRA	176
2013022	Exploiting introgression for the development of productive and regionally adapted varieties for New South Wales.	CRP	64
2013029	Selecting for favourable plant x soil water interactions.	C Ext	155
2013030	Applying the genome sequence for variety improvement: validation and implementation.	C Ext	109
2013358	Developing cytogenetic and molecular tools to improve selection for soil-borne pathogen resistance in wild hybrids.	C SRA	264
2013805	China germplasm for resistance.	CRP	28
2013806	Sugarcane for future climates.	C SRA	67
2014053	Phase 1: advancing yield, disease resistance and ratooning by exploiting new sources of genetic variability from wild relatives of sugarcane.	C SRA	592
2014054	Optimising productivity and variety recommendations through analysis of mill data.	CRP	109
2014069 / 2014801	Field assessment and further development of high-sucrose sugarcane.	CRP	408
2015002 / 2015805	Sugarcane root systems for increased productivity, development and application of a root health assay.	CRP	260
2015004	Impact of stool architecture on ratooning ability.	C Ext	187
2015016	Leaf sucrose: the link to diseases, physiological disorders such as YCS and sugarcane productivity.	C SRA	487
2015025 / 2015809	Generation of a high throughput SNP chip for introgression of resistance genes from wild germplasm into sugarcane, targeting smut, <i>Pachymetra</i> and nematodes, to generate more resistant varieties faster.	CRP	245
2015026 / 2015808	Selecting high value chromosomes from wild introgression material to deliver more resistant varieties faster.	CRP	302

<sup>5</sup> Project type classifications are: 'C SRA' is SRA provider/RFU contracted projects; 'C Ext' is external provider/RFU contracted projects; 'CRP' is collaborative research project; and 'SRA' is SRA core research, development and adoption projects.

PROJECTS			
Project No.	Description	Project Type <sup>5</sup>	2016/17 \$k
2015027	The Sugarcane Hub – development of an interface between the sugarcane genome sequence and sugarcane genetic data to allow researchers to identify genes that underpin important agronomic traits.	C Ext	144
2015081	Assessment of new soft cane varieties.	C Ext	10
2016028	Improving early stage selection of SRA breeding program by indirect selection of plant vigour.	C SRA	301
2016032	Optimising productivity, variety recommendations and mill operations through analysis of mill data.	C SRA	282
2016039	New approaches to identify and integrate <i>Pachymetra</i> resistance genes from <i>Erianthus</i> into SRA breeding program.	C SRA	30
2016044	Licence to Farm: nitrogen-use efficient varieties to meet the future environmental targets.	C SRA	314
2016802	Australian Research Council (ARC) Linkage Project: Biochemical phenotyping of water logged sugarcane roots (University of Melbourne).	CRP	168
2016803	Australia-India Strategic Research Fund (AISRF): Genetic control of genomic selection for important traits in sugarcane.	CRP	475
ANADATA	Statistical analysis of data.	SRA	186
BIODTLY / BIODWFD	Development of resistant varieties.	SRA	802
PLANBKN / PLANCEN / PLANNSW / PLANNTN / PLANSTH	Plant breeding – core selection.	SRA	6,304
PLANCRO	Plant breeding – crossing.	SRA	519
PLANINT	Plant breeding – integrated database and crossing systems.	SRA	202
PLANMGT	Breeding management.	SRA	332
PLANPAC	Redefining <i>Pachymetra</i> root rot management strategies and varietal resistance in commercial fields.	SRA	210
PLANPBR	Plant Breeder's Rights.	SRA	73
PLANSPE	Spectracane support.	SRA	129
PLANVPD	Variety propagation and distribution.	SRA	287
<b>Total Investment KFA1</b>			<b>16,399</b>

## KFA2: Soil health and nutrient management

### OBJECTIVES

KFA2/OBJ1	To identify, understand and improve soil health issues that may be negatively affecting sugarcane productivity. This will include research and development covering crop nutrition; soil biology; soil fertility; regional soil factors; chemical utilisation; and reduction of soil pathogens and nematodes.
KFA2/OBJ2	To understand the impact of on-farm practices on water quality.
KFA2/OBJ3	To develop improved methods and tools to enable, or improve, cane production on poor performing or marginal soils.

### OUTPUTS for 2016/17

KFA2/DEL1	Suite of research and tools to improve nitrogen-use management and address environmental and productivity concerns, including: <ul style="list-style-type: none"> <li>- industry course materials for SIX EASY STEPS™ and NutriCalc; and</li> <li>- review of SIX EASY STEPS™ nitrogen recommendations.</li> </ul>
KFA2/DEL2	Assessment of plant crop response to sub-soil amelioration.
KFA2/DEL3	Soil sampling and microbial analysis to identify soil pathogen inoculum levels and tests for presence of disease suppressive organisms
KFA2/DEL4	Factors associated with disease suppression identified and indicators ranked for use in extension activities with growers.
KFA2/DEL5	Recommendations for controlled released fertilisers in a range of environments and crop management scenarios communicated to industry.
KFA2/DEL6	Model to estimate crop responsiveness to nitrogen applied, incorporating management zones and climate forecasting information.
KFA2/DEL7	Strategic alliance with Queensland Government to support a sound and scientific-based approach to nitrogen research.

### OUTCOMES

KFA2/OUT1	Soil health is improved with a resulting positive impact on environment and yield growth.
KFA2/OUT2	Improved reputation and relationship between industry and environmental groups.

KEY PERFORMANCE INDICATORS		TARGETS
KFA2/KPI1	Grower uptake of SIX EASY STEPS™.	70% of growers use SIX EASY STEPS™, as measured in the SRA Grower survey.
KFA2/KPI2	Adoption of new and/or best practice fertiliser application or management.	25% of growers adopted new fertiliser application or management practices over the last two years, as measured in the SRA Grower Survey.

PROJECTS			
Project No.	Description	Project Type <sup>6</sup>	2016/17 \$k
2013101	Strategies to manage soil-borne fungi and mitigate sugarcane yield decline.	C Ext	276
2014004 / 2015801	Regenerating a soil food web capable of improving soil health and reducing losses from soil-borne pests and pathogens of sugarcane.	CRP	239
2014011	Role of controlled release fertiliser in Australian sugarcane systems.	C Ext	271
2014045	Boosting nitrogen-use efficiency in sugarcane through temporal and spatial management options.	CRP	916
2014805	Burdekin cane growing nitrogen trials.	CRP	308
2015065	Improving nitrogen-use efficiency for sugarcane crops with constrained yield potential.	C SRA	277
2015069	Decision support for nitrogen management: soil nitrogen mineralisation tests and contribution to crop nitrogen requirements.	C Ext	140
2015070	Spatially explicit estimation of Achievable Yield Potential - an improved basis for fertiliser management.	C Ext	142
2015074	Improving management practices of legume crop residues to maximise economic and environmental benefits.	C Ext	124
2015075 / 2015807	How big will that crop be? Incorporating climate forecasting to improve nitrogen management in the Wet Tropics.	CRP	235
2015905	Waste to revenue: novel fertilisers and feeds.	C Ext	31
2015907	More profit from nitrogen: enhancing the nutrient use efficiency of intensive cropping and pasture systems.	C Ext	378
2016063	Validating SIX EASY STEPS™ across regions and soil types.	C Ext	250
<b>Total Investment KFA2</b>			<b>3,587</b>

<sup>6</sup> Project type classifications are: 'C SRA' is SRA provider/RFU contracted projects; 'C Ext' is external provider/RFU contracted projects; 'CRP' is collaborative research project; and 'SRA' is SRA core research, development and adoption projects.

## KFA3: Pest, disease and weed management

### OBJECTIVES

KFA3/OBJ1	To proactively support an enhanced biosecurity capability for the Australian sugar industry.
KFA3/OBJ2	To minimise the economic and environmental impacts of pests, diseases and weeds through targeted research.

### OUTPUTS for 2016/17

KFA3/DEL1	Causal factor/s as to why YCS <sup>7</sup> affected sugarcane cannot export sucrose from the leaves, including identification of where and when this physiological disorder starts – as it is now evident that yellowing of the leaves is only the final terminal stage of YCS.
KFA3/DEL2	Evaluation of two hypotheses to determine the causal factor/s for compromised water transport in YCS affected sugarcane. Hypothesis 1: Physical blockage to water movement in the vascular tissue. Hypothesis 2: Induced stomatal closure in the leaves reduces the driving force for water movement.
KFA3/DEL3	Ongoing research, including Next Generation Sequencing, to identify the biological factors that may cause or drive the development of YCS.
KFA3/DEL4	Determination of the genetic variability in sugarcane for YCS tolerance and the abiotic/environmental factors which trigger symptom expression.
KFA3/DEL5	Evaluation of sucrose, starch and the Si/Mg ratio as potential diagnostic tools to identify the presence of YCS prior to symptom development.
KFA3/DEL6	Assessment of root system structure and root health to establish any link to development of YCS.
KFA3/DEL7	Development of strategies to manage the impact of YCS.
KFA3/DEL8	Ongoing field trials and pot experiments for developing alternatives to Photosystem II (PSII) herbicides in the Wet Tropics.
KFA3/DEL9	Revised Industry Biosecurity Plan, Grower Biosecurity Manual and updated information to manage future biosecurity risks from exotic pest species not currently in Australia.
KFA3/DEL10	Assessment of new-generation insecticide options and remote sensing technology (SPOT 6 and GeoEye imagery) for canegrub control.
KFA3/DEL11	Protocols and methods for resistance screening for exotic moth borers and diseases, including downy mildew, Ramu stunt and <i>Scirpophaga</i> borers.
KFA3/DEL12	Chemical trials assessed to determine effectiveness of a range of insecticides for suppressing Soldier Fly populations.
KFA3/DEL13	Operational weed recognition technology.
KFA3/DEL14	Pre-commercial evaluation and delivery to industry of Leaf Sheath Biopsies-Polymerase Chain Reaction (LSB-PCR) diagnostic tool for ratoon stunting disease.
KFA3/DEL15	Ongoing biosecurity, entomological and pathological capacity for the Australian sugarcane industry.

<sup>7</sup> Until the cause(s) of YCS is known, the YCS research program will be managed by SRA under this KFA. It is not however classified as a pest or disease.

OUTCOMES	
KFA3/OUT1	A comprehensive RD&E program that addresses existing and emerging pests, diseases and weeds, allowing sugarcane growers to manage their crops efficiently with minimal environmental impacts.
KFA3/OUT2	An enhanced industry capacity to deal with incursions of exotic pests, diseases and weeds.

KEY PERFORMANCE INDICATORS		TARGETS
KFA3/KPI1	More efficient application and management of chemicals, sprays, herbicides or pesticides.	20% of growers adopted new chemical application or management practices over the last two years, as measured in the SRA Grower Survey.
KFA3/KPI2	Capability to provide entomology, pathology and weed expertise to meet the pest, disease and weed diagnostic and management needs of the industry.	Capability maintained under SRA's core research.
KFA3/KPI3	Up-to-date dossiers to support contingency plans to minimise threats and impacts of key exotics.	Reviewed annually.
KFA3/KPI4	Diagnostic testing to ensure that sugarcane diseases are not imported or spread within Australia.	Over 1,000 diagnostic tests conducted.
KFA3/KPI5	Quarantine protocols completed for import/export of sugarcane varieties.	Up to 35 new varieties imported/exported as part of SRA variety exchange program.

PROJECTS			
Project No.	Description	Project Type <sup>8</sup>	2016/17 \$k
2013802	Australian Centre for International Agricultural Research (ACIAR) - Integrated disease management of sugarcane streak mosaic in Indonesia.	CRP	329
2014049	Solving YCS.	C SRA	962
2014050	Developing an alternative herbicide management strategy to replace PSII herbicides in the Wet Tropics area.	C SRA	335
2014082	A novel polyphasic framework to resolve YCS paradox.	C Ext	89
2014086	Validation of LSB-PCR diagnostic for ratoon stunting disease and characterisation of non-Lxx strains of <i>Leifsonia</i> associated with sugarcane.	CRP	64
2014088 / 2014803	Review of the sugarcane Industry Biosecurity Plan and development of a Grower Biosecurity Manual.	CRP	12

<sup>8</sup> Project type classifications are: 'C SRA' is SRA provider/RFU contracted projects; 'C Ext' is external provider/RFU contracted projects; 'CRP' is collaborative research project; and 'SRA' is SRA core research, development and adoption projects.

<b>PROJECTS</b>			
<b>Project No.</b>	<b>Description</b>	<b>Project Type<sup>8</sup></b>	<b>2016/17 \$k</b>
2015038	Delivery of remote sensing technology to combat canegrubs in Queensland cane fields.	C SRA	119
2015046	Securing Australia from Papua New Guinean biosecurity threats.	C SRA	264
2015055 / 2015815	Field ready, optimised precision weed identification and spray system.	CRP	367
2015078	Pre-commercial evaluation of a PCR-diagnostic for ratoon stunting disease and the development of a business case for full implementation.	C SRA	164
2015804	Soldier Fly management.	CRP	75
2015810 – 2015814	Screening.	CRP	37
2016003	Identifying new-generation insecticides for canegrub control as contingency for loss of amenity with the existing product.	C SRA	374
2016041	You can't manage what you can't identify - managing threats from exotic moth borers through accurate identification.	C SRA	69
2016047	Molecular assay of major soil-borne pathogens for better exploitation of commercial varieties.	C SRA	146
2016064	YCS.	C Ext	400
BIOEBBG / BIOEMER / BIOEMKY	Biosecurity entomology.	SRA	89
BIOPIND / BIOPTLY / BIOPWFD	Biosecurity pathology.	SRA	537
BIOQUAR	Quarantine pathology.	SRA	331
BIORSDL	Ratoon Stunting Disease (RSD) laboratory.	SRA	116
BIOSMGT	Biosecurity management.	SRA	129
BIOSPLY	Soil pathogen laboratory.	SRA	77
PHEAMGT	Plant health management.	SRA	142
<b>Total Investment KFA3</b>			<b>5,227</b>

## KFA4: Farming systems and production management

### OBJECTIVES

KFA4/OBJ1	To conduct research into farming practices leading to the optimal use of inputs with specific emphasis on water management (including irrigation and drainage) and mitigating the impact of rising energy costs.
KFA4/OBJ2	To conduct research on planting technologies, ratooning, break-crop and fallow practices to optimise yields.
KFA4/OBJ3	To facilitate the practical application of the value chain model to enhance grower, harvester and miller interfaces and improve the adoption of harvesting best-practices.

### OUTPUTS for 2016/17

KFA4/DEL1	Traits associated with varietal waterlogging tolerance identified and ratings incorporated into QCANESelect™ if appropriate.
KFA4/DEL2	Harvesting best practice trials to quantify sugar loss and stool damage completed and recommendations communicated to industry.
KFA4/DEL3	Yield monitoring and mapping tool/protocol.
KFA4/DEL4	Whole-of-farm economic analysis for different fallow options in the Burdekin.
KFA4/DEL5	Feasibility study of sensors for improved harvesting data and feedback.
KFA4/DEL6	Yield forecasts for the 2016 season distributed to mills.
KFA4/DEL7	Non-pneumatic 150 tonne/hour pilot cane cleaning system built and tested.
KFA4/DEL8	Automated furrow irrigation system refined with adaptive control, second season of demonstration trials and results communicated to industry.
KFA4/DEL9	Effect of laser levelling on plant crop productivity assessed.
KFA4/DEL10	Ongoing refinement and demonstration of harvest decision-making tool (SCHLOT).

### OUTCOMES

KFA4/OUT1	Growers and harvesters benefit from the ongoing research in productivity improvement, production management and agronomical techniques.
KFA4/OUT2	Developed technologies and management practices that enhance productivity and demonstrate a high rate of return on investment.

KEY PERFORMANCE INDICATORS		TARGETS
KFA4/KPI1	Adoption of new and/or best practice farming techniques and technology.	60% of growers adopted new farming practices over the last two years, as measured in the SRA Grower Survey.
KFA4/KPI2	Adoption of Harvesting Best Outcomes.	Greater participation in HBO trials across sugarcane regions.

<b>PROJECTS</b>			
<b>Project No.</b>	<b>Description</b>	<b>Project Type<sup>9</sup></b>	<b>2016/17 \$k</b>
2013025	Developing remote sensing as an industry-wide yield forecasting, nitrogen mapping and research aide.	C Ext	26
2014028 / 2014809	Product and profit: delivering precision to users of Precision Agriculture in the Australian sugarcane industry – yield monitoring.	CRP	262
2014035	A non-pneumatic cane cleaning system with no cane loss.	C Ext	263
2014046	Too wet to forget: reducing the impact of excessive rainfall on productivity.	C SRA	279
2014048	Increased harvest recovery: reducing sugar loss and stool damage.	C SRA	373
2014079	Modernisation of furrow irrigation in the sugarcane industry.	C Ext	173
2014094	Demonstration of GPS-guided laser levelling and its associated productivity response.	C Ext	1
2014804	New planting technologies: from lab to field.	CRP	196
2015007	Assessment of new management strategies and varieties for marginal soils.	C SRA	385
2015051 / 2015802	Bio-prospecting for beneficial endophytes of sugarcane.	CRP	585
2015077	Cropping solutions for the sugarcane farming systems of the Burdekin – extension of 2011/922.	C SRA	49
2015079	Incorporation of Australian crop data and industry characteristics into a tool to facilitate informed harvest decision-making for the Australian industry.	C Ext	34
2015080	Sensors for improved harvesting feedback: a feasibility study.	C SRA	89
2015908	Accelerating precision agriculture to decision agriculture.	C Ext	50
2016062	Remote sensing platform for precision agriculture.	C Ext	430
<b>Total Investment KFA4</b>			<b>3,195</b>

<sup>9</sup> Project type classifications are: 'C SRA' is SRA provider/RFU contracted projects; 'C Ext' is external provider/RFU contracted projects; 'CRP' is collaborative research project; and 'SRA' is SRA core research, development and adoption projects.

## KFA5: Milling efficiency and technology

### OBJECTIVES

KFA5/OBJ1	To review logistics management to reduce operational costs and improve mill capacity utilisation.
KFA5/OBJ2	To identify and/or develop new or improved processes, technology and/or infrastructure to increase mill processing efficiency.
KFA5/OBJ3	To undertake research into quality issues (such as trash, fibre content and impurities) to identify possible solutions – at the variety development, harvesting and processing sectors of the value chain.

### OUTPUTS for 2016/17

KFA5/DEL1	Rapid analysis methodologies, including: <ul style="list-style-type: none"> <li>- turn-key system to measure quality parameters of factory steams and educational report on industry validity;</li> <li>- new knowledge on Near infrared (NIR) calibration models for factory products; and</li> <li>- standardised protocol, trialled at mills and ready for implementation by industry.</li> </ul>
KFA5/DEL2	Improved wet scrubber model and recommendations.
KFA5/DEL3	Improved rail transport management system ready for use at most sites for improved delivery and scheduling of cane to the mill.
KFA5/DEL4	Configuration tests and recommendations for hammer and shredder grid design for improved cane preparation.
KFA5/DEL5	Recommendations for preferred Robert evaporator designs.
KFA5/DEL6	Testing of coating material for wear and corrosion resistance to reduce boiler maintenance costs.
KFA5/DEL7	Results of investigation into various evaporator technologies utilised in overseas factories synthesised and sucrose losses measured at factories with large Robert evaporators.

### OUTCOMES

KFA5/OUT1	Optimised mill transport and logistics.
KFA5/OUT2	Mill capacity and efficiency is optimised through improved processes, technology and value chain coordination and collaboration.

KEY PERFORMANCE INDICATORS		TARGETS
KFA5/KPI1	Adoption of improved or novel milling processes and technology.	All milling groups aware of available new processes and technology.
KFA5/KPI2	Adoption of laboratory NIR systems.	25% of sugar mills adopting new systems within two years of project completion.

<b>PROJECTS</b>			
<b>Project No.</b>	<b>Description</b>	<b>Project Type<sup>10</sup></b>	<b>2016/17 \$k</b>
2012054	Determine the optimum tube dimensions for Robert evaporators through experimental investigations and modelling.	C Ext	9
2012055	Improved modelling of wet scrubbers.	C Ext	26
2013059	A retrofit to a mill to reduce its operational and maintenance costs.	C Ext	46
2013060	Reducing the maintenance costs of mill rolls.	C Ext	73
2014037	Real-time harvest and transport system.	C Ext	168
2014051	Improving mill efficiency through rapid analysis methodologies.	CRP	125
2014052	Managing aspects of raw sugar quality in the Australian sugar industry.	CRP	145
2015013 / 2015806	Investigation into modifying pan boiling techniques to improve sugar quality.	CRP	370
2015018	Increasing capacity to undertake cane preparation research through modelling and experimentation.	C Ext	106
2015043	Develop a blueprint for the introduction of new processing technologies for Australian factories.	C Ext	277
2016019	Developing online analysis systems to measure the available nutrients in mill mud.	C SRA	44
2016020	Reducing boiler maintenance costs and deferring capital expenditure through improved technology.	C Ext	153
NIRDMER	NIR at Meringa.	SRA	150
PLANCAS	Cane Analysis System (CAS) service and support.	SRA	324
<b>Total Investment KFA5</b>			<b>2,016</b>

<sup>10</sup> Project type classifications are: 'C SRA' is SRA provider/RFU contracted projects; 'C Ext' is external provider/RFU contracted projects; 'CRP' is collaborative research project; and 'SRA' is SRA core research, development and adoption projects.

## KFA6: Product diversification and value addition

### OBJECTIVES

KFA6/OBJ1	To facilitate and conduct ongoing research to identify and/or develop alternative products or uses for sugarcane and determine the basic requirements for adoption.
KFA6/OBJ2	To facilitate or undertake economic feasibility studies of identified industry by-products, their use and likely market viability.

### OUTPUTS for 2016/17

KFA6/DEL1	Pilot plant testing for the production of paper pulp from bagasse.
KFA6/DEL2	Laboratory assessments of new technologies to enhance sugarcane products for use as animal feed ingredients, chemicals and biofuels.

### OUTCOME

KFA6/OUT1	An established research program that monitors, facilitates and develops alternative and innovative uses for sugarcane.
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### KEY PERFORMANCE INDICATOR

### TARGET

KFA6/KPI1	Identification of new opportunities in product diversification and innovation.	Bio-refinery opportunities identified and prioritised.
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### PROJECTS

Project No.	Description	Project Type <sup>11</sup>	2016/17 \$k
2012053	Process for making bagasse paper pulp.	C Ext	62
2015902	A profitable future for Australian agriculture: Bio-refineries for higher-value animal feeds, chemicals and fuels.	C Ext	1,325
2016801	ARC Linkage Project: Manipulation of carbon partitioning to enhance the value of sugarcane (University of Queensland).	CRP	100
<b>Total Investment KFA6</b>			<b>1,487</b>

<sup>11</sup> Project type classifications are: 'C SRA' is SRA provider/RFU contracted projects; 'C Ext' is external provider/RFU contracted projects; 'CRP' is collaborative research project; and 'SRA' is SRA core research, development and adoption projects.

## KFA7: Knowledge and technology transfer and adoption

### OBJECTIVES

KFA7/OBJ1	To improve the coordination among different adoption service providers, advisers and researchers and create an environment that optimises innovation and adoption at the farm level and encourages research that meets industry needs.
KFA7/OBJ2	To ensure research proposals have adoption mechanisms in place, where appropriate, to facilitate transfer of knowledge and technologies to industry members.
KFA7/OBJ3	To develop and implement communication tools and mechanisms to inform industry members on research projects, progress made on the projects and results of the research efforts.
KFA7/OBJ4	To assess the uptake of developed technologies and evaluate the effectiveness of technology transfer tools.
KFA7/OBJ5	To develop appropriate technology transfer tools to disseminate research findings to end-users to facilitate their uptake by growers and millers.

### OUTPUTS for 2016/17

KFA7/DEL1	Industry-supported model for facilitation of technology transfer and practice change, with SRA Adoption group providing the dual role of translator and facilitator.
KFA7/DEL2	Ongoing facilitation and support for the adoption of SmartCane Best Management Practices (BMP), including case studies and adoption activities to measure and demonstrate profitability and environmental implications.
KFA7/DEL3	Grower-led field demonstrations of insecticide and herbicide BMP in the Wet Tropics.
KFA7/DEL4	Soil health and soil biology master classes in Ingham, Mackay and northern New South Wales, including grower management plans and ongoing support to facilitate practice change.
KFA7/DEL5	Ongoing trials and demonstrations to promote adoption of tissue culture material.
KFA7/DEL6	Extension of farm business intelligence data with industry to improve business performance and business planning skills.
KFA7/DEL7	Trial results and recommendations for harvesting BMP in the Burdekin and New South Wales communicated to industry.
KFA7/DEL8	Current and historic productivity data standardised for use in an integrated spatial database to support industry research and adoption.
KFA7/DEL9	Ongoing release of a suite of communication tools, including: e-newsletters; Cane Clips; Cane Connection; and Milling Matters.
KFA7/DEL10	Training activities that up-skill advisors and mill staff utilising a range of methods including face-to-face, electronic and web based activities, including webinars.
KFA7/DEL11	Suite of technical resources that assist the extension and advisory sector to work with growers to enhance productivity and profitability.
KFA7/DEL12	ACTIV adoption activity and practice change monitoring database enhanced.

<b>OUTPUTS for 2016/17</b>	
KFA7/DEL13	Engagement and consultation with SRA Delegates through: <ul style="list-style-type: none"> <li>- regular communications from SRA's Chief Executive Officer;</li> <li>- SRA Adoption group activities; and</li> <li>- Delegate Meetings, including meeting on the findings of SRA's Independent Performance Review.</li> </ul>
KFA7/DEL14	Annual grower survey that measures several aspects of practice change and grower perceptions of SRA's adoption activities and RD&E performance.
KFA7/DEL15	Impact assessments and cost benefit evaluations on a selection of projects and/or programs to demonstrate the value of SRA RD&E investments to industry and government investors.
KFA7/DEL16	Constructive and ongoing relationship with the media that uses the media to promote SRA activities and key messages and as a useful means of communicating broadly with SRA investors and stakeholders.
KFA7/DEL17	Internal communication processes that foster a positive working environment at SRA to facilitate high performance and achievement of the organisation.

<b>OUTCOMES</b>	
KFA7/OUT1	Research results and new technologies are communicated and transferred in an appropriate and timely manner across the industry value chain, supporting increased uptake of best-practice and innovative technology.
KFA7/OUT2	A skilled advisory sector that drives the adoption of new technology.
KFA7/OUT3	An industry knowledge base that incorporates and makes freely available the most up-to-date production methodologies to industry.
KFA7/OUT4	Collaborative alliances, partnerships and networks that optimise synergies, integrate knowledge and share best-practices.

<b>KEY PERFORMANCE INDICATORS</b>		<b>TARGETS</b>
KFA7/KPI1	Industry-supported model to focus on facilitating measurable practice change and appropriate R&D to increase profitability, productivity and sustainability of Australian sugarcane growers and millers.	Positive feedback from growers, millers and advisory sector.
KFA7/KPI2	Satisfaction rating for SRA updates and publications.	Increased rating from 3.6 out of 5 to 3.8 out of 5, as measured in the SRA grower survey.
KFA7/KPI3	Satisfaction rating for SRA events and field days.	Increased rating from 3.8 out of 5 to 4 out of 5, as measured in the SRA Grower survey.
KFA7/KPI4	SRA performance rating.	Increase from 66% 'high' to 70% 'high', as measured in the SRA Grower survey.

KEY PERFORMANCE INDICATORS		TARGETS
KFA7/KPI5	Economic returns from RD&E investments.	Aggregated Benefit-Cost Ratio of 4:1, as measured through annual independent evaluations of a selection of projects/programs in SRA's RD&E portfolio.

PROJECTS			
Project No.	Description	Project Type <sup>12</sup>	2016/17 \$k
2007002	Performance evaluation of SRA's R&D investments.	C Ext	116
2014001	Increasing farm business intelligence within the sugarcane industry.	C Ext	60
2014015	Measuring the profitability and environmental implications when growers transition to BMP (as defined by SmartCane BMP).	C Ext	61
2014091	Improving industry returns through harvest best practice.	C Ext	31
2014092	Understanding the impact of harvester speed on subsequent ratoon performance in the Burdekin.	C Ext	43
2014093	Tissue culture - managing impediments to adoption in Tully.	C Ext	23
2014806	CANEGROWERS SmartCane BMP contract.	CRP	83
2015045	Sugarcane industry productivity and data recording spatial data hub for research and extension.	C Ext	50
2015906	Stimulating private sector extension in Australian agriculture to increase returns from R&D.	C Ext	20
2016001	A boiler simulator for improving operator training.	C Ext	65
2016002	Protecting our chemicals for the future through accelerated adoption of best management practice.	C SRA	461
2016025	Master classes in soil health/soil biology for the sugarcane industry.	C Ext	131
COMMMGR	SRA communications, marketing and graphic design.	SRA	703
EXECPEC	Executive management - research adoption.	SRA	52
PECCOMM	Research adoption - non-project.	SRA	2,288
<b>Total Investment KFA7</b>			<b>4,187</b>

<sup>12</sup> Project type classifications are: 'C SRA' is SRA provider/RFU contracted projects; 'C Ext' is external provider/RFU contracted projects; 'CRP' is collaborative research project; and 'SRA' is SRA core research, development and adoption projects.

## KFA8: Capability development, attraction and retention

### OBJECTIVES

KFA8/OBJ1	To conduct a review of current and future RD&E skills and capacity needs for the sugarcane industry, in collaboration with DAF.
KFA8/OBJ2	To actively promote and facilitate the development and retention of current industry participants, as well as attract new participants to the sugarcane industry.
KFA8/OBJ3	To foster collaboration for cross-industry and cross-sectoral skill development, innovation and networks.

### OUTPUTS for 2016/17

KFA8/DEL1	National Sugarcane Industry RD&E Strategy, incorporating assessment of industry RD&E capability and capacity.
KFA8/DEL2	Postgraduate research scholarships and support program for early and mid-career researchers designed to develop and enhance long-term industry research capacity.
KFA8/DEL3	Travel and learning awards to promote the search and development of new industry research, development and adoption ideas.
KFA8/DEL4	Young Industry Participants Development Program and annual forum.
KFA8/DEL5	Support and participation in cross-sectoral research and development activities, such as collaborations and knowledge exchange with other Research and Development Corporations and participation in research programs, including: Biofuels and Bioenergy; Climate Change and Managing Climate Variation; Water Use in Agriculture; Plant Biosecurity; Precision Agriculture; and Soils.
KFA8/DEL6	Develop schemes to provide training for undergraduate scholars in engineering and agriculture.

### OUTCOMES

KFA8/OUT1	A highly skilled industry workforce with the knowledge and capability to meet current and future needs of the industry.
KFA8/OUT2	Connected and respected, both domestically and internationally.
KFA8/OUT3	Motivated industry participants who promote an enthusiastic approach to solving industry issues.
KFA8/OUT4	Research communication, collaboration and integration with activities across the cropping systems.

KEY PERFORMANCE INDICATORS		TARGETS
KFA8/KPI1	Scholarships awarded to current and future industry participants.	Maintain a minimum of 6 postgraduate scholarships and 2 early-career research awards per year.
KFA8/KPI2	Development of schemes for the training of undergraduate students in factory (engineering) and field sectors.	Minimum of 2 awards for each discipline.

KEY PERFORMANCE INDICATORS		TARGETS
KFA8/KPI3	SRA participation and investment in relevant collaborative and cross-sectoral RD&E programs and the Commonwealth Government's Rural R&D for Profit Programme.	Ongoing participation and financial support for collaborative programs.

PROJECTS			
Project No.	Description	Project Type <sup>13</sup>	2016/17 \$k
2007003	Cross-sectoral investment.	C Ext	205
2011072	PhD Scholarship: Enhancing sugarcane for decreased water content and increased sugar content at harvest.	C Ext	1
2012042	TRAIL Blazer Scholarship.	C Ext	11
2013077	PhD Scholarship: Investigating the utility of mill mud for soil health conditioning and nutrient use efficiency on sodic soils within the Burdekin.	C Ext	1
2013078	PhD Scholarship: Effect of organic nutrients on sugarcane growth, microbial activity and greenhouse gas emissions.	C Ext	1
2013900	Contribution to Council of Rural Research and Development Corporations (CRRDC).	C Ext	25
2014102	PhD Scholarship: Sugarcane for water limited environments – characterisation of a selected sugarcane germplasm for transpiration efficiency and high biomass production for the sugarcane growing regions in Australia.	C Ext	11
2014104	PhD Scholarship: Exploiting soil microbe associations with sugarcane roots for resistance to canegrubs.	C Ext	9
2014107	Sugar Industry Postgraduate Research Scholarships (SPRS): Investigation of genetic control of sugar accumulation within the sugarcane culm (stalk).	C Ext	29
2014108	SPRS: Soil nitrogen dynamics – a microdialysis approach to quantify nitrogen cycling in sugarcane soils.	C Ext	29
2014109	SPRS: Statistical data mining algorithms for optimising analysis of spectroscopic data from on-line NIR mill systems – improving system calibrations for quality measures and variety discrimination.	C Ext	42
2014200	Research workshops.	C SRA	20
2014201	Other capability investment.	C Ext C SRA	194
2014402	Early Career Research Awards: Enhancing sugarcane growth and yield by biocontrol agents / biofertilisers.	C Ext	15
2015103	Mesostigmatid mites as predators of nematodes in sugarcane soils: occurrence, ecology, food preferences and biocontrol potential.	C Ext	30

<sup>13</sup> Project type classifications are: 'C SRA' is SRA provider/RFU contracted projects; 'C Ext' is external provider/RFU contracted projects; 'CRP' is collaborative research project; and 'SRA' is SRA core research, development and adoption projects.

<b>PROJECTS</b>			
<b>Project No.</b>	<b>Description</b>	<b>Project Type<sup>13</sup></b>	<b>2016/17 \$k</b>
2015105	Plant growth promoting rhizobacteria for Australian sugarcane: bridging the gap from simple systems to engineered microbiomes.	C Ext	30
2015108	Creation of an intuitive user interface between traffic officers and rail transport scheduling software.	C Ext	42
2015301 – 2015315	Sugar Industry Travel and Learning Awards (STLA).	C Ext C SRA	7
2015401	Delivery technology of bio-fertiliser for next-generation sugarcane cropping without pollution footprint.	C Ext	14
2015402	Delivering a novel DNA-based diagnostic for root health to the sugarcane industry.	C Ext	15
2015903	Smarter irrigation for profit.	C Ext	10
<b>Total Investment KFA8</b>			<b>741</b>

## 5. CENTRALLY-MANAGED RESEARCH AND CORPORATE SUPPORT

SRA's eight RD&E focused KFAs are actively supported by a centrally-managed research function and corporate support services.

OBJECTIVES	
CMR/OBJ1	Embed performance leadership and culture.
CMR/OBJ2	Improve financial management and budgetary control.
CMR/OBJ3	Enhance investor relationships and communication.
CMR/OBJ4	Enable corporate support systems.
CMR/OBJ5	Augment contestable investment governance.

OUTPUTS for 2016/17	
CMR/DEL1	Continued implementation of values and cultural development program.
CMR/DEL2	Employee performance plans and mid-year performance appraisals, aligned to KFAs.
CMR/DEL3	Finance, treasury and procurement management systems, services and reporting.
CMR/DEL4	Budget preparation, management and reporting, including quarterly reviews and reforecasting.
CMR/DEL5	Annual financial statements and audit sign-off.
CMR/DEL6	Internal audit reviews (as per Internal Audit Plan), including: <ul style="list-style-type: none"> <li>- Budgeting, forecasting and performance monitoring processes and controls;</li> <li>- Core Information Technology (IT) processes; and</li> <li>- Research data management processes and controls.</li> </ul>
CMR/DEL7	Investor engagement and communication framework, including regular scheduled consultation between SRA and industry representative bodies and government investor representatives.
CMR/DEL8	Monitoring and evaluation system embedded to support Board and investor reporting on RD&E outputs, outcomes and impacts.
CMR/DEL9	Engagement and Consultation Plan for the development of SRA's new Strategic Plan.
CMR/DEL10	2017/18 - 2021/22 Strategic Plan, developed in collaboration with investors, researchers and other industry stakeholders.
CMR/DEL11	Independent Performance Review of SRA completed and SRA's response and implementation plan presented to a meeting of SRA Delegates and published on SRA's website.
CMR/DEL12	Annual Performance Report and Annual Report highlighting SRA's organisational and RD&E performance.
CMR/DEL13	SRA workforce capability, talent management and succession plan for key positions.
CMR/DEL14	Human resources (HR) and workplace health, safety and environmental management, framework and system improvements, reporting and support services.
CMR/DEL15	Workplace health and safety systems fully compliant to state and Commonwealth laws and to ASNZ4801:2001.

OUTPUTS for 2016/17	
CMR/DEL16	IT, records management and library systems and support services.
CMR/DEL17	Legal and company secretarial services and support.
CMR/DEL18	Risk register review and update to reflect changes in SRA's strategic and operating environment, including a Business Continuity Plan and Crisis Management Plan.
CMR/DEL19	SPIDNet database review and enhancement.
CMR/DEL20	Intellectual Property (IP) management and reporting system.
CMR/DEL21	Asset Management Plan reviewed and updated.
CMR/DEL22	Research station support services and farm operations and management.
CMR/DEL23	RD&E investment portfolio gap analysis.
CMR/DEL24	Contestable investment project call(s), evaluation, selection and communication of RD&E portfolio to begin in 2017/18.
CMR/DEL25	Investment contract management and milestone reporting enhanced to support investment portfolio management and governance.

OUTCOMES	
CMR/OUT1	Performance-based and investor-focused organisational culture and values.
CMR/OUT2	Sustainable financial position for SRA, consistent with investor expectations.
CMR/OUT3	Strengthened trust and reputation with our investors, collaborators and other stakeholders.
CMR/OUT4	Robust corporate support and governance, with the highest level of organisational probity, integrity and compliance.
CMR/OUT5	RD&E investment portfolio aligned with industry and government investor priorities.

KEY PERFORMANCE INDICATORS		TARGETS
CMR/KPI1	Employee performance and values-based KPI targets achieved, as defined in employee performance plans.	100% of all staff have KPIs in place with clearly defined measures for Living, Lifting and Leading. Employee performance against measures will be assessed annually.
CMR/KPI2	Financial and budgetary control.	Budget variance targets - by group and at organisational level - Living +/- 20%, Lifting +/- 15% and Leading +/- 10%.
CMR/KPI3	Investor feedback.	Positive feedback from industry representative bodies and government representatives, as expressed at formal meetings.

KEY PERFORMANCE INDICATORS		TARGETS
CMR/KPI4	Statutory compliance, including: financial reporting; Statutory Funding Agreement; DAF Deed of Agreement and Department of Environment and Heritage Protection Deed of Agreement.	100% compliance with statutory obligations and requirements.
CMR/KPI5	Alignment of RD&E investment portfolio with investor priorities.	Endorsement of Strategic Plan and Annual Operational Plans by Commonwealth Government; executed funding agreement with DAF; and endorsement of Strategic Plan by industry representative bodies.

PROJECTS			
Project No.	Description	Project Type <sup>14</sup>	2017/18 \$k
<b>1. Centrally-Managed Research</b>			
Various	Research funding management.	SRA	1,426
Various	R&D executive management.	SRA	452
Various	Research stations.	SRA	2,152
2014800	SRA research capability.	SRA	110
<b>2. Corporate Support</b>			
Various	Board and investor relations.	SRA	1,047
Various	Corporate support.	SRA	1,481
<b>Total Investment Centrally-Managed Research and Corporate Support</b>			<b>6,668</b>

<sup>14</sup> Project type classifications are: 'C SRA' is SRA provider/RFU contracted projects; 'C Ext' is external provider/RFU contracted projects; 'CRP' is collaborative research project; and 'SRA' is SRA core research, development and adoption projects.

## 6. INCOME AND EXPENDITURE FORECAST

	2016/17
Income	\$k
Industry contribution (statutory levy) <sup>15</sup>	23,108
Commonwealth Government contribution <sup>16</sup>	5,700
Queensland Government investment <sup>17</sup>	3,628
Collaboration/Service Fee income <sup>18</sup>	3,485
Interest	1,250
Other <sup>19</sup>	3,255
<b>Income total</b>	<b>40,426</b>
Expenditure <sup>20</sup>	
<b>R&amp;D</b>	
External contestable <sup>21</sup>	9,911
Internal contestable	9,813
Internal core <sup>22</sup>	13,983
Industrial contract research	2,676
R&D management <sup>23</sup>	4,140
<b>R&amp;D total</b>	<b>40,522</b>
<b>Corporate</b>	
Board and investor relations	1,047
Corporate support <sup>24</sup>	1,481
<b>Corporate total</b>	<b>2,528</b>
<b>Operating expenditure total</b>	<b>43,050</b>
<b>SRA operating result for the year</b>	<b>(2,624)</b>

SRA's current RD&E investment portfolio is structured to meet our investor priorities and expectations with respect to delivering valued benefits and maximised return on investment. To deliver on our portfolio and achieve these outcomes, SRA is estimating an operating deficit in 2016/17. This deficit will be covered by SRA's accumulated financial reserves.

<sup>15</sup> Assumes crop production of 33 million tonnes for 2016 season.

<sup>16</sup> Commonwealth Matching Funds payments made under the 2013-2017 Statutory Funding Agreement between SRA and the Commonwealth Government, administered by the Department of Agriculture. Assumes industry size is static for matching ceiling. Net of International Sugar Organisation membership.

<sup>17</sup> Includes \$2.85m DAF contribution and Department of Environment and Heritage Protection's Nitrogen collaborative project income.

<sup>18</sup> Includes \$882k from Rural R&D for Profit Programme.

<sup>19</sup> Includes \$2.5m from potential Bundaberg land sale.

<sup>20</sup> Non-external expenditure reflects post-overhead allocations.

<sup>21</sup> Includes (\$460k) for milestones in current year that complete in following year.

<sup>22</sup> Internal core includes plant breeding, biosecurity, plant health, communications and adoption.

<sup>23</sup> Includes research funding management, research stations and resources and research KFA management.

<sup>24</sup> Includes Finance, IT, HR, Library and IP.

## ATTACHMENT 1 – Alignment of SRA’s KFAs to Industry and Government Priorities

Stakeholder Priorities	SRA Key Focus Areas							
	1. Optimally-adapted varieties, plant breeding and release	2. Soil health and nutrient management	3. Pest, disease and weed management	4. Farming systems and production management	5. Milling efficiency and technology	6. Product diversification and value addition	7. Knowledge and technology transfer and adoption	8. Capability development, attraction and retention
<b>Statement on Priorities for Research 2011 – 2014 – Key Issues for Research Action<sup>25</sup></b>								
1. Industry growth – need to stop decline and build to 36Mtpa, including by RD&E to increase yield and achieve step-change in productivity								
2. Cost and profitability – of cane and sugar production, across different farm types and mills, including by RD&E on efficiency along the value chain								
3. Environmental and regulatory pressures – including by RD&E into water, chemicals and technologies/systems to lift environmental sensitivity								
4. Diversification – biomass, fuel and new products								
<b>National Science and Research Priorities<sup>26</sup></b>								
1. Food								
2. Soil and water								
3. Transport								
4. Cybersecurity								
5. Energy								
6. Resources								
7. Advanced manufacturing								
8. Environmental change								
9. Health								

<sup>25</sup> Statement on Priorities for Research 2011 – 2014, Australian Sugar Industry Alliance, 2011.

<sup>26</sup> National Science and Research Priorities, Australian Government, 2015.

Stakeholder Priorities	SRA Key Focus Areas							
	1. Optimally-adapted varieties, plant breeding and release	2. Soil health and nutrient management	3. Pest, disease and weed management	4. Farming systems and production management	5. Milling efficiency and technology	6. Product diversification and value addition	7. Knowledge and technology transfer and adoption	8. Capability development, attraction and retention
<b>Rural RD&amp;E Priorities<sup>27</sup></b>								
1. Advanced technology								
2. Biosecurity								
3. Soil, water and managing natural resources								
4. Adoption of R&D								
<b>Queensland's Food and Fibre Policy<sup>28</sup></b>								
1. Drive growth, efficiency and sustainability								
2. Support a modern and skilled workforce								
3. Advance research and development								
4. Improve Queensland's biosecurity capability								
5. Deliver service innovation								
<b>National Sugarcane Industry RD&amp;E Strategy – Goals<sup>29</sup></b>								
1. A growth industry, successfully competing in the world market, through profitable businesses								
2. Successful diversification into related sugarcane products, using world-class research and development								
3. Global leaders in environmental sustainability								
4. Dynamic and cooperative industry leadership								

<sup>27</sup> Rural RD&E Priorities, Agricultural Competitiveness White Paper, Australian Government, 2015.

<sup>28</sup> Queensland's Food and Fibre Policy – Labor's Plan for Agriculture, Queensland Labor Party, 2015. The Queensland Government is currently developing a ten-year agriculture and food RD&E 'Blueprint' and supporting 'Roadmaps' which will augment the objectives in Food and Fibre – Labor's Plan for Agriculture.

<sup>29</sup> National Sugarcane Industry RD&E Strategy, 2010.

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## ATTACHMENT 2 – Abbreviations and Acronyms

ACIAR	Australian Centre for International Agricultural Research
AISRF	Australia-India Strategic Research Fund
AOP	Annual Operational Plan
ARC	Australian Research Council
BMP	Best Management Practice
C Ext	External Provider/Research Funding Unit Contracted Projects
C SRA	SRA Provider/Research Funding Unit Contracted Projects
CAS	Cane Analysis System
CCS	Commercial Cane Sugar
CEO	Chief Executive Officer
CRP	Collaborative Research Project
CRRDC	Council of Rural Research and Development Corporations
CSIRO	Commonwealth Scientific and Industrial Research Organisation
Cth	Commonwealth
DAF	Department of Agriculture and Fisheries (Queensland)
DAWR	Department of Agriculture and Water Resources (Commonwealth)
DNA	Deoxyribonucleic Acid
EM	Extraneous Matter
GM	Genetically-Modified
GPS	Global Positioning System
HBO	Harvesting Best Outcomes
HR	Human Resources
HT	Herbicide-Tolerant
IOC	Industry Owned Company
IP	Intellectual Property
IT	Information Technology
KFAs	Key Focus Areas
KPIs	Key Performance Indicators
LSB-PCR	Leaf Sheath Biopsies-Polymerase Chain Reaction
M&E	Monitoring and Evaluation
Mtpa	Million Tonnes per Annum
NIR	Near Infrared
NSW	New South Wales
NUE	Nitrogen-Use Efficiency
PBR	Plant Breeder's Rights
PCR	Polymerase Chain Reaction
PSII	Photosystem II
QLD	Queensland
R&D	Research and Development
RDCs	Research and Development Corporations
RD&E	Research, Development and Extension
RFP	Research Funding Panel
RFU	Research Funding Unit
RSD	Ratoon Stunting Disease
SFA	Statutory Funding Agreement
SNP	Single Nucleotide Polymorphism
SPRS	Sugar Industry Postgraduate Research Scholarships
SRA	Sugar Research Australia Limited
SRDC	Sugar Research and Development Corporation
STLA	Sugar Industry Travel and Learning Award
TCH	Tonnes of Cane per Hectare
TSH	Tonnes of Sugar per Hectare
WUE	Water-Use Efficiency
YCS	Yellow Canopy Syndrome

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