

SUGAR RESEARCH AUSTRALIA LIMITED
PERFORMANCE REPORT

18/19

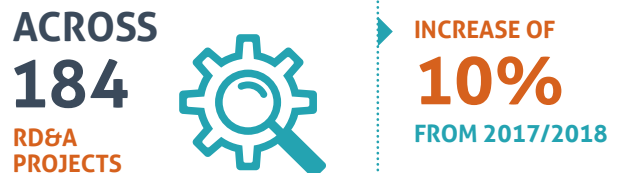
PERFORMANCE REPORT 2018/19 SUMMARY

Sugar Research Australia Limited (SRA) is Australia's specialist sugarcane research organisation. We invest in evidence-based research, development and adoption (RD&A) activities on behalf of sugarcane growers and millers to meet industry challenges and opportunities.

Working with government, research and industry partners, SRA is committed to achieving our goals to drive profitability, improve sustainability, enhance capability, and strengthen organisational excellence. In pursuit of these goals we are guided by SRA's Strategic Plan 2017/18 – 2021/22 and Annual Operational Plans which outline our key focus areas (KFAs), activities, intended outcomes and performance measures. SRA's Performance Report 2018/19 provides an overview of our performance in delivering these plans during this period.

The Performance Report is by no means exhaustive but rather provides an aggregated and succinct review of the performance of SRA's KFAs. This report is a companion document to SRA's 2018/19 Annual Report where significant initiatives, collaborations and corporate governance overviews are provided. In addition, SRA's website and periodical publications, such as CaneConnection, MillingMatters and electronic newsletters, provide further information on SRA's research portfolio and the impact this research is having on the Australian sugarcane industry.

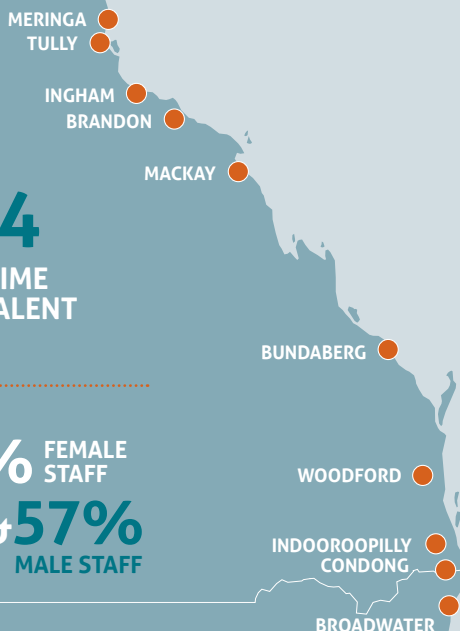
OUR IMPACT PATHWAY



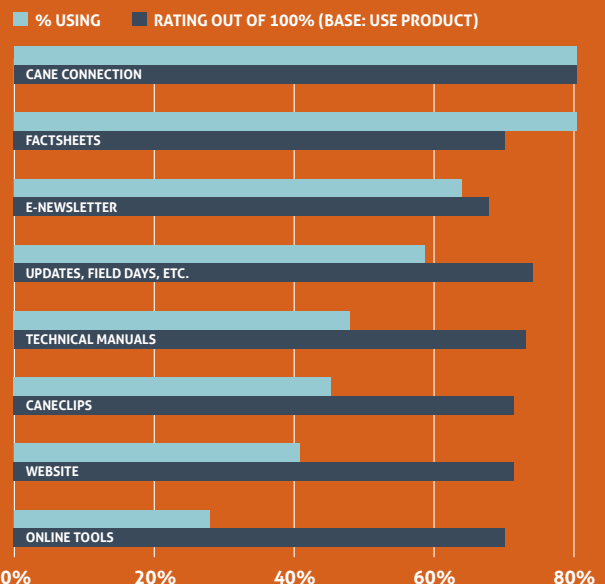
OUR LOCATIONS

164 FULL-TIME EQUIVALENT STAFF

43% FEMALE STAFF & **57%** MALE STAFF



OUR PRODUCT & SERVICE USAGE & RATINGS



SOURCE: SRA GROWER SURVEY, JUNE 2019

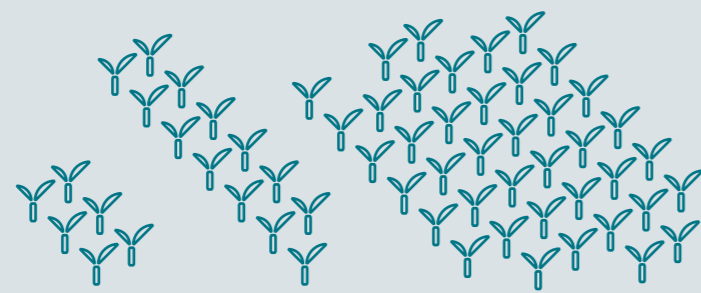
OUR VALUE CHAIN



- 13 new varieties released
- 102,505 tissue culture plantlets ordered
- Methodologies for identifying Single nucleotide polymorphism (SNP) markers developed
- SNP markers linked to traits of agronomic importance identified

- Baseline description of healthy sugarcane root systems completed
- Substantial valuable data on sugarcane Transcriptome, Metabolome and Proteome produced
- Gene expression data produced for Pachymetra root rot, smut and nematode infection
- Sequencing information obtained from the isolated *Erianthus* chromosome is a potential marker for Pachymetra resistance

- New progeny bred for new sources of Pachymetra resistance for SRA's introgression program
- Protocols for Remotely Piloted Aircraft (RPA) -based hyperspectral imagery and screening developed



PATs
4,946 PLOTS

CATs
12,100 PLOTS

FATs
16,144 PLOTS

PATs - PROGENY ASSESSMENT TRIALS
CATs - CLONAL ASSESSMENT TRIALS
FATs - FINAL ASSESSMENT TRIALS



- In-field soil health test kit refined for industry testing and release
- Sugarcane Soil Health Toolbox released
- 4:1 return on investment from research on nitrogen management using climate forecasting
- Australian Sugarcane Nutrition Manual released
- 3:1 return on investment from research on the appropriate conditions to consider the use of enhanced efficiency fertilisers
- CogCalibrator tool released
- Calibration for the root DNA diagnostic assay developed

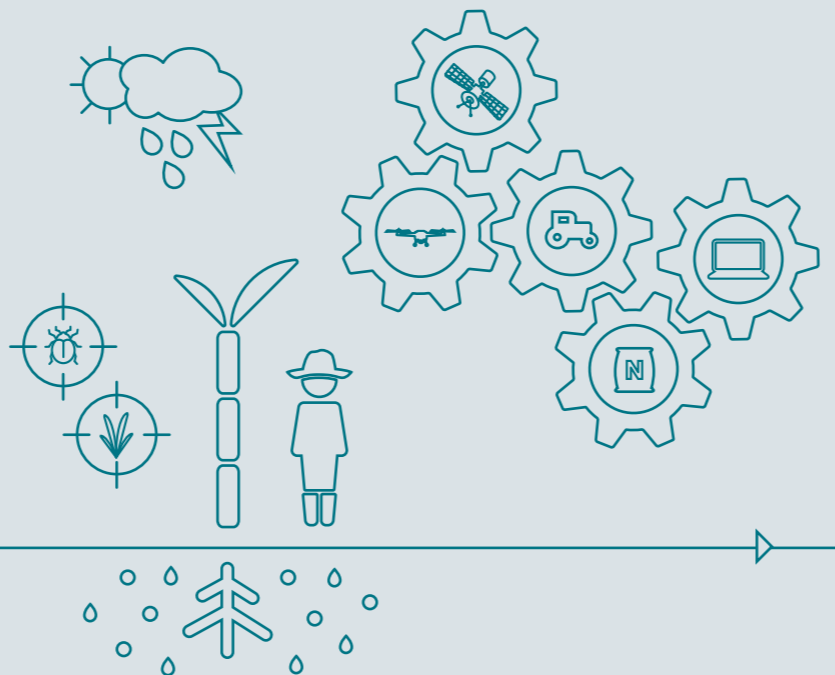
- Enhanced understanding and capacity to manage root-associated fungi and potential to improve root disease prediction and management
- Field trials and crop modelling is providing new understanding on enhanced efficiency fertiliser management practices
- Water quality monitoring and analysis undertaken at 3 demonstration sites, with further funding secured through Reef Trust and Great Barrier Reef Foundation to continue and expand water quality monitoring program



- Molecular pathogen diagnostic assays developed for soil borne pathogen, with a 5:1 return on investment
- New prototype in-field diagnostic kit for Yellow Canopy Syndrome (YCS) developed
- Improved commercial assay for Ratoon Stunting Disease (RSD) investigated for delivery to industry in 2020/21

- Moth borer diagnostic protocol developed
- Moth borer phylogenetic trees developed highlighting the genetic diversity and relationships of major moth borers
- Established larval feeding behaviour of Soldier Fly which will inform further laboratory and glasshouse studies

- 5:1 return on investment from development of diagnostic tests and risk management strategies for biosecurity threats from Papua New Guinea
- 53 industry extension and productivity services staff received disease training at SRA's Woodford research station
- Prototype Spot Spray sensor system developed and licenced to a commercial partner
- 3:1 return on investment from alternative herbicide management strategy for the Wet Tropics



- Economic analysis showed 5:1 return on investment for some sugarcane farmers in the Wet Tropics as a result of changing practices in line with established Best Management Practices
- 43 replicated Harvest Best Practice demonstration trials completed in 2017 and 52 in 2018
- Completed testing under commercial conditions of the real-time harvest decision-making tool (SCHLOT Live)
- Yield forecasts derived from satellite imagery delivered to mills

- 7 irrigation hubs established across the industry
- Protocol for screening beneficial endophytes against important pathogens and nematodes developed and tested for several microbes
- Ready-reckoner calculators developed to support irrigation system selection, design and operation



- 6:1 return on investment from the development of a blueprint for new processing technologies
- Coatings identified for resistance to erosion and corrosion in boiler tubes
- 5:1 return on investment from development of milling spatial data hub
- Evaluations completed on new and emerging near infra-red (NIR) technology
- 2:1 return on investment from research on fibre quality assessment and effects of cane varieties
- MicroNIR successfully trialled for monitoring bagasse moisture

- Evaluation of Ultrasonic Time Of Flight (TOF) sensors for use in mill evaporators completed
- Evaluation and recommendations for rotor hammer configurations completed
- Strategies developed to increase the pH level of condensates to reduce corrosion in evaporators and reduce sugar degradation
- Lab-scale apparatus and procedures designed and constructed for simulating boiling conditions in sugar factory evaporators



- New processes and technologies developed for the use of sugarcane in animal feed, including new bagasse and trash pre-treatment processes to improve nutritional value
- Report highlighting value add and diversification options for the Australian sugarcane industry published



- Modules covering low grade fugals and cooling crystallisation developed for mill operations-based Learning Management System
- Capability appointments at Queensland University of Technology for the milling sector, with commencement of 3 new research staff
- 9 emerging industry leaders graduated from the inaugural Next Crop leadership development program








- Regional Adoption Advisory groups established, with Regional Adoption Action Plans in place
- Extension resources developed to communicate water quality monitoring results and practice change to improve nitrogen and pesticide use
- Evaluation of irrigation scheduling tools completed with recommendations provided to industry
- Boiler simulator demonstrations completed and training package developed
- 4 CaneConnection magazines, 2 MillingMatters magazines and fortnightly eNewsletters published
- Research Updates, shed meetings and field demonstrations held throughout sugarcane regions



OUR PERFORMANCE

(AGAINST OUR 2018/19 ANNUAL OPERATIONAL PLAN)

OUR KEY FOCUS AREAS (KFAs)	INPUTS	ACTIVITIES	OUTPUTS *	PERFORMANCE INDICATORS
 KFA1 / OPTIMALLY-ADAPTED VARIETIES, PLANT BREEDING AND RELEASE	\$14.2 million 41 projects	SRA's sugarcane plant-breeding investment program produces new and improved sugarcane varieties and facilitates their release and distribution for commercial production.	23 RD&A deliverables ● = 87% ● = 9% ● = 4%	A 2% genetic gain per annum, as measured by FAT test clone performance by 2022. ● A 12% increase in varietal performance over 10 years by 2022. ● SRA's breeding program utilises molecular markers in selection by 2022. ●
 KFA2 / SOIL HEALTH, NUTRIENT MANAGEMENT AND ENVIRONMENTAL SUSTAINABILITY	\$4.9 million 19 projects	Investments related to improving soil health, management of nutrients and chemical inputs, capability to predict and adapt to climatic conditions and sustainability and social license to farm.	18 RD&A deliverables ● = 83% ● = 17% ● = 0%	Release of updated nitrogen management recommendations by 2020. ● Release of recommendations for the use of Enhanced Efficiency Fertilisers by 2021. ● 90% of growers using SIX EASY STEPS® by 2022. ●
 KFA3 / PEST, DISEASE AND WEED MANAGEMENT	\$5.5 million 34 projects	Investments delivering improvements in pest, disease and weed management and SRA's Yellow Canopy Syndrome (YCS) research portfolio.	24 RD&A deliverables ● = 63% ● = 29% ● = 8%	Up-to-date dossiers reflecting current knowledge for high-risk exotic threats, reviewed annually. ● At least 20% of growers adopted new and/ or improved pest management strategies within last five years. ○ At least 2,000 clones from various stages of the selection programs, parents and foreign clones screened annually. ●
 KFA4 / FARMING SYSTEMS AND HARVESTING	\$3.8 million 17 projects	Investments dedicated to optimisation of sugarcane farming and harvesting systems. Focus areas include precision agriculture, water management, cropping management and on-farm energy efficiency research.	12 RD&A deliverables ● = 100% ● = 0% ● = 0%	Positive input-output efficiency ratios resulting from adoption of new technology and practices. ● A 10% increase in harvesting best practice demonstration sites per region per annum. ●
 KFA5 / MILLING EFFICIENCY AND TECHNOLOGY	\$1.7 million 18 projects	Investments in improving milling process efficiency and utilisation, optimising cane quality and transport and increasing sugar quality.	14 RD&A deliverables ● = 79% ● = 14% ● = 7%	Miller Performance rating for SRA. ● Miller satisfaction and performance with SRA. ●
 KFA6 / PRODUCT DIVERSIFICATION AND VALUE ADDITION	\$1.7 million 3 projects	Investments including identification of new opportunities and uses for sugarcane, analysis of value-add opportunities and prioritisation of future industry diversification options.	2 RD&A deliverables ● = 100% ● = 0% ● = 0%	Completion of technical review of diversification opportunities by 2019. ● Identification of new opportunities for product diversification by 2020. ●
 KFA7 / KNOWLEDGE AND TECHNOLOGY TRANSFER AND ADOPTION	\$4.7 million 14 projects	Investments relating to adoption activities, research to understand and improve knowledge transfer, and projects to improve sugarcane farm business, risk management and decision making.	8 RD&A deliverables ● = 63% ● = 25% ● = 12%	At least 70% of growers producing more than 7,000 tonnes per annum adopted new practices and/or technology over two-year period. ● At least 50% of growers producing less than 7,000 tonnes per annum adopted new practices and/or technology over two-year period. ● Average grower and miller satisfaction with SRA adoption and communication activities rating of 4 out of 5 achieved by 2022. ● Improved industry adoption outcomes through implementation of the Strategy for Industry Led Adoption Activities. ●
 KFA8 / COLLABORATION AND CAPABILITY DEVELOPMENT	\$1.6 million 38 projects plus various cross-sectoral investment activity	Investments in capacity and capability development of industry and research personnel, and cross-sectoral collaborations to leverage knowledge, resources and impact.	12 RD&A deliverables ● = 92% ● = 8% ● = 0%	SRA participation and investment in relevant collaborative and cross-sectoral programs, including the Commonwealth's Rural R&D for Profit Programme. ● Maintain a minimum of four postgraduate scholarships and two research awards each year. ● At least two short-term placements per annum of students and/ or professionals in research or industry positions for industry exposure. ●
 KFA9 / ORGANISATIONAL EFFECTIVENESS	\$7.3 million	SRA's corporate, finance functions and operations including facilities and farms.	15 RD&A deliverables ● = 73% ● = 27% ● = 0%	SRA Investor performance Rating increase to 85% by 2022. ● Aggregated research investment benefit-cost ratio of 4:1 or above by 2022. ● Maintain 100% compliance with statutory and contractual requirements. ●

* OUTPUT PERFORMANCE RATING:
 ● DELIVERED / ON TRACK / NO ISSUES
 ● NOT DELIVERED / IN PROGRESS / A RISK BUT NOT AN ISSUE YET
 ● NOT DELIVERED / SERIOUS DELAYS / MAJOR ISSUES
 ○ PERFORMANCE DATA NOT COLLECTED FOR 2018/2019

(Cover image) Herbert district grower Mark Zatta with a rainfall simulation being run on his property near Abergowrie, as part of the Cane to Creek 2.0 project. This project is funded by a partnership between the Australian Government's Reef Trust, the Great Barrier Reef Foundation with support from SRA.

Sugar Research Australia Limited

Brisbane Office 50 Meiers Road, Indooroopilly QLD 4068 Australia

Postal Address PO Box 86 Indooroopilly QLD 4068 Australia

T 07 3331 3333

E sra@sugarresearch.com.au

sugarresearch.com.au

Acknowledgements

SRA acknowledges AgTrans Research for undertaking the impact assessments reported in this document and thanks its investors, including levy payers (sugarcane growers and millers), the Commonwealth Government and the Queensland Government.



Australian Government
Department of Agriculture
and Water Resources



Queensland
Government

ISSN: 2206-5520 (Online) © Copyright 2019 by Sugar Research Australia Limited. All rights reserved. No part of the Performance Report 2018/19 (this publication), may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior permission of Sugar Research Australia Limited.

Disclaimer: In this disclaimer a reference to 'SRA', 'we', 'us' or 'our' means Sugar Research Australia Limited and our directors, officers, agents and employees. Although we do our very best to present information that is correct and accurate, we make no warranties, guarantees or representations about the suitability, reliability, currency or accuracy of the information we present in this publication, for any purposes. Subject to any terms implied by law and which cannot be excluded, we accept no responsibility for any loss, damage, cost or expense incurred by you as a result of the use of, or reliance on, any materials and information appearing in this publication. You, the user, accept sole responsibility and risk associated with the use and results of the information appearing in this publication, and you agree that we will not be liable for any loss or damage whatsoever (including through negligence) arising out of, or in connection with the use of this publication. We recommend that you contact our staff before acting on any information provided in this publication. **Warning:** Our tests, inspections and recommendations should not be relied on without further, independent inquiries. They may not be accurate, complete or applicable for your particular needs for many reasons, including (for example) SRA being unaware of other matters relevant to individual crops, the analysis of unrepresentative samples or the influence of environmental, managerial or other factors on product.